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Dear Member:

This is the time of the year to plan for the future of our Society and then to see to it that the plan is carried out to the best advantage. Some such goals may be: Increase in the number of Chapters, increased membership, promote attendance at our forthcoming convention, formation of committees to secure articles for the Armed Forces Comptroller. These are the responsibility of the chapter officers, of our National Council and of each member, collectively and individually.

There is no doubt that any organization will function better as a progressive body with some definite accomplishment in mind. One goal the National Council has set, as representative of the membership is 10 new chapters by 1 July 1958 and 50 new chapters by 1959. Let every member do his or her part to reach this objective. Results are sure to come. There are many ways we can exert our efforts; talk up the objectives of our Society, participate in chapter activities, contribute an article for the Armed Forces Comptroller journal, correspond with your friends and opposites in other cities or installations who should be members and who can begin new chapters. Paid Subscriptions and paid advertising for the journal are being explored. This will necessarily call for a continious flow of articles representing progressive ideas developing in the comptroller shops of the Army, Navy, Air Force, Marines and Coast Guard. Be articulate and give everyone the opportunity, to review, evaluate, and possibly adopt a progressive idea you may have.

The American Society of Military Comptrollers can and will go forward only to the extent each member gives his or her services. It is your Secretary's hope that this year will be a banner year for ASMC and we can make this possible by giving our services and doing just a little better than we did last year. Perhaps you are going through a period of reducing overhead and you are under more pressure to accomplish your share of work but the harder it is to reach our goals, the more satisfying it is when we see our efforts rewarded by results.

Very truly yours

Oscar Lightner

Oscar Lightner, National Secretary

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ELECTRONICS FOR MANAGEMENT
(Automatic Data Processing at a Class I Installation)

John S. Cole
Lieutenant Colonel, U. S. Army
Office, Comptroller of the Army

The use of electronic computers to predict the path of an earth satellite has focused the attention of the average citizen upon the use of this type of equipment for solving scientific problems. The use within this field is well established, dating back to the early days of World War II when ENIAC (Electronic Numerical Integrator and Computer) was built under the sponsorship of the Army. It has been only within the current decade that the vast capabilities of electronic computers have been applied to the solution of business-type problems.

Numerous studies have disclosed a greatly expanded paper workload in recent years. This is due primarily to the natural growth of the government and a discovery by management that it can do a much better job with more complete, accurate, and timely information at hand. Both industry and the Armed Forces have felt this paperwork increase. More efficient methods, through the use of conventional labor-saving devices, have helped keep this "paper Monster" from completely immobilizing our organizations. The electronic computer now promises to further free us from the tentacles of this administrative octopus. Within the Army the transition to electronic methods to reduce the workload is especially important as we endeavor to obtain greater combat power from reduced manpower resources.

EARLY APPLICATIONS IN THE ARMY

The first applications of electronic computers to business-type operations in the Army were in the field of logistics with the installation of computers in the Engineer Supply Control Office in St. Louis and the Quartermaster Inventory Center at Richmond, Virginia in January 1956. Studies for these and other supply applications had been originated in 1954 and earlier. At the time of this writing, the Army has 22 business-type computers in operation or being installed. With the exception of two computers (a large scale computer for personnel accounting in the Office of the Adjutant General in Washington and a medium scale computer at the Finance Center in Indianapolis) the applications are all in the field of logistics.

Realizing that the majority of paper work in the Army is generated at installation level (the post, camp, and station), the Assistant Secretary of the Army for Financial Management, early in 1956, directed that a Task Force be formed under the chairmanship of the Comptroller of the Army. In addition to members of OCA, the task force was composed of representatives from the Office of the Deputy Chief of Staff for Personnel, the Deputy Chief of Staff for Logistics and Chief of Finance with liaison from Continental Army Command, Second Army and Third Army. The mission of the task force was to determine the feasibility of utilizing automatic data processing equipment (ADPE) to perform data processing at a Class I installation.

Fort Meade, Maryland and Fort Jackson, South Carolina were selected as sites for the feasibility study. Two locations were selected in order to validate fact finding from installations having generally different type missions and to determine the impact of the Army Command Management System on the data processing workload (at the time of this study ACMS had been implemented only at Fort Jackson and Fort Gordon, Georgia).

THE MANUAL SYSTEM VS AUTOMATIC DATA PROCESSING SYSTEM

Before describing the feasibility study let us examine the limitations of a manual system together with the capabilities of an automatic data processing system. Since to err is human, we multiply the chances of making an error each time a person records or manipulates data. In order to minimize this factor in a manual system, actions and figures are checked by duplicate procedures. In some cases, this duplication is repeated as many as a dozen or more times. It is the old case of "I trust no one." In addition to the duplication of procedures, there is frequently a duplication of records and reports since the same basic information is required in more than one data processing area. (Supply, Personnel, Financial, etc.). Numerous summarizations and semi-summarizations are required since it is impossible in a manual system to go directly from a large mass of detailed information to a condensed report. One objective of an optimum data processing system should be the capture of basic data in machine intelligible language with a minimum of human action. The production of machine intelligible language as a by-product of the preparation of a source document is one means of reducing human effort and error.

One advantage of ADPS, evident from the start, is the reduction of human errors, for once information is introduced into the computer the computer the processing becomes automatic without necessity for human intervention. Computers are constructed and programmed to be self-checking. It is also evident that great care must be taken to ensure that only accurate infor-

mation is entered into the system; otherwise, ADPS will merely produce inaccurate results more rapidly.

An important factor in an automatic data processing system is its ability to assimilate and digest large quantities of information, store and process this information in accordance with previously planned procedures, and provide management with the answers it needs to arrive at accurate and timely decisions.

THE FEASIBILITY STUDY

The mission of the task force was to determine the amount of data processing at a Class I installation susceptible to automation, and whether such data processing would economically justify a further study for the installation of a computer. The first problem of the task force was the accurate determination of the data processing workload. Since it is the end products (records and reports) required by management that places the requirement on the organizational elements to record basic data at the source, the starting point was Army Regulation 335-11, which sets forth the authorized recurring reports. With this as a basis, the reports control officer of the installation was contacted to determine what additional records and reports were required by the Continental Army and Installation. Members of the task force then followed down through the chain of command to the various reporting organizations and, by interview and questioning, determined exactly what was done with regard to record maintenance and reporting, and by whom and what organizational element. The chain of paper work was followed down to the point where the original information entered into the system through a source document. In this manner, a complete inventory of the data processing at Fort Meade and Fort Jackson was compiled. The cost of this data processing was computed by extending, at a standard cost, the civilian and military hours required in the preparation of these records and reports. At the same time an estimate was made of that portion of the specific procedures adaptable to automation.

Even though the missions of Fort Meade and Fort Jackson were considerably different, there was little difference in their data processing workload. More than 1,000 separate records and reports were maintained at each installation, the majority of which were identical at both installations. Since there was little difference in the over-all workload or the breakdown of this workload between the various areas, the figures presented in Illustration 1 are for Fort Meade. The eleven areas indicated for automation were somewhat arbitrarily designated in order to present a condensed summary. It should be noted that the total cost of processing, $1,200,000 is for strictly "pencil pushing" type of work and does not include supervision or review and analysis; nor does it include the preparation of source documents. The task force estimated that the operation of an automatic data processing system which would adequately provide for the processing indicated would cost between $100,000 and $300,000 per year. This cost includes the rental of equipment, pay for operating personnel, and necessary supplies.

It can be observed from Illustration 1 that none of the eleven areas in itself would adequately and economically support the operation of an ADPS. It was the conclusion of the task force, therefore, that the operation of an automatic data processing system to provide service for the areas indicated would be economically sound provided the system were operated as a service center. Based upon these conclusions, it was the recommendation of the task force that an engineering study be undertaken for the application and installation of an automatic data processing system at a Class I installation. This recommendation was approved by the Assistant Secretary of the Army for Financial Management, and the Comptroller of the Army was directed to proceed with the engineering study for the installation of a computer. This involves the design of a system for the use of electronic digital computers, and establishment of specifications for equipment suitable to the specific requirements.

THE ENGINEERING STUDY

Fort Meade was selected as the site for the engineering study and the task force that conducted the feasibility study continued with the engineering study, organized essentially as it had been for the original study, with the exception of some additional personnel and much closer liaison with Fort Meade.

While information flows within a data processing system from a source document on through the system to a final report, as indicated above, it is the requirement imposed by the final report that establishes the necessity for recording data at the source. For convenience, the task force classified documents into two general categories, source documents and end products. The latter were further divided into three categories; basic records, intermediate records and final reports. To facilitate analysis of results the end products were coded 1, 2, and 3 respectively, with source documents coded zero. A schematic grid chart is shown in illustration 2 to indicate the flow of information from the source documents into the end products. Basic records are those documents that are maintained for the normal day-to-day operation of the installation. Typical basic records are stock records, personnel records, ledgers, etc. Final reports are the compilation of data furnished management and outside agencies. Intermediate records are those normally required in a manual system for the semi-summarization and sum-

marization of data. Typical of the intermediate record is the worksheet, summarization of data by sub-activity, journals, etc. These are required in a manual system since it is impractical to go directly from a mass of detailed information to a consolidated final report. Since an automatic data processing system has the capability of assimilating and manipulating large masses of data and producing consolidated reports, intermediate type records should no longer be required. If management requires the information contained in an intermediate record, it will be maintained as a basic record or produced as a final report.

It will be noted from illustration 2 that source documents furnish the mass of information required by basic records and some of the information required by intermediate records and final reports. The normal flow of data is from source documents to basic records; from basic records to intermediate records which then become the major input to the final report.

In order to properly indicate the flow of data organization-wise and provide the basis for determining the impact upon personnel, a simple organization code was utilized as indicated in illustration 3. A two-digit code was utilized to denote the major organizational element with sub-organizational elements being indicated by digits to the right of the decimal point.

The first step for members of the task force in the fact finding phase of the engineering study was the collection of all documents and the coding of them to indicate the type of document and the organizational element that was processing the document.

Five general areas for fact finding were established. These were supply, civilian personnel, military personnel, finance, and a miscellaneous area which included activities such as the film library, training aids, etc. These major areas were further divided into logical areas such as the seven technical services within supply, and within the technical services item accounting, financial inventory accounting, stock funding, etc. Documents were collected and a grid chart constructed within each sub-area.

The procedures used in processing data from the source through to the end product were determined by interrogation of the personnel within the various organizational elements who did the actual processing of the data. A sequence chart, as indicated in illustration 4, was constructed for each document processed. Six different types of action can be taken on a document (set of data). These are test, sort, file, post, copy and erase. A separate sequence was established for each different process or when a procedure changed to a different organizational element.

Process charts were completed for each sequence of the sequence chart. This was done by detailed interrogation of the personnel that did the processing. In instances where a group of individuals, within an organizational element, accomplished the same procedure, several different individuals were questioned to assure that there was no significant difference in the procedure. The form of the process chart was designed and utilized by the task force to ensure uniformity of presentation and completeness of the fact finding. An example is shown in illustration 5. The upper portion of the chart is for identification and control purposes. The major area might be "supply"; the data processing activity, "item accounting"; set of data (the document being charted), "DA 1546"; Type, "O" (code for source document); action, test; Sequence "I" of "5" sequences; TFM No., "11" (a number designated for each task force member); organizational element (element processing this sequence); organizational code (coded as indicated in illustration 3); line number (lines numbered sequentially); result from line No. (used for reference to actions carried forward); condition (used where a compare action is indicated , , , , ,);element of data (that element of data appearing on the set of data that is being processed); class (code for type of element, identification, quantitative or authority). The nine action verbs indicated (copy, erase, etc.) were determined by the task force to describe all actions that could be taken on an element of data. The action on each element was indicated by an "X" in the appropriate box. Code (the numerical code for the indicated action). On the righthand portion of the chart is indicated the set of data and the element of data on which the action was taken against the element on the left. The authority for the action was indicated by regulation so that this authority could be checked against the date of preparation to determine whether significant changes had been published effecting procedures. The process charts, when completed, give the detailed procedures required under the current system to obtain the desired end product from the source information.

Analysis of the grid, sequence and process charts prepared during the engineering study clearly revealed two important factors. First, that the same source documents were used in several areas to provide the basic information and establish the criterion for further processing; secondly, in the manual system numerous sequences and procedures were repeated many times (in some cases the same procedure was repeated more than a dozen times). Since a computer can be programmed to perform many required checks and has built within it "self-checking" features, the necessity to perform duplicate operations for the purpose of detecting errors is obviated. From this we arrive at one of the main objectives - Integrated Data Processing - the use of a common source document to provide management with the end products it requires in one uninterrupted sequential operation. For example, we would expect to bring into the system the supply requirement of an organiza-

tion for a specific item with a minimum amount of information being required - designation of the organization, item required, quantity required and whether it is an initial or replenishment requisition. All of the additional information required to process this request would be stored within the machine. We would then be able to take the necessary action to supply the item, update the financial inventory, stock fund, financial records, etc., as well as to take such other action as resupply of the item to the warehouse when required. Similar procedures would be applicable in the military personnel, civilian personnel and miscellaneous field. Naturally the systems will also be integrated between themselves.

DEVELOPMENT OF THE NEW SYSTEM

By analysis of the sequence, grid, and process charts, we eliminate duplication. The system must provide the final reports required by management for planning, review and supervision as well as the basic record required for day-to-day management. The former become the required output of the system (at such times and frequencies as required) while the latter will dictate the storage requirements of the system since these are the items that will be maintained within the machine, updated by the individual transactions and become output only as such information is required. Examples of the latter type are stock records, personnel records, etc.

The specifications as submitted to the computer manufacturers will be in general terms within five major areas; supply accounting, civilian personnel accounting, military personnel accounting, financial accounting and miscellaneous (film library, training aids, etc.,), to provide for maximum integration. Each of these areas will be further broken down into logical subdivisions. For each of these sub-areas the manufacturer will be given the information as to the requirement for "file," "processing" and "output." The file will be set forth by number of elements of data and number of digits required. The processing will be delineated by number of elements of data, number of digits and the average number of processing transactions for a specific period. The output will be specified by frequency, type, and format. This information will be given in as general terms as possible in order that the various manufacturers will have the maximum amount of freedom and latitude in adapting their equipment to the requirements of the system.

An objective of the system, of vital interest to the manufacturer, is the elimination to the maximum extent possible of human action and, if possible, to obtain as a by-product of the preparation of a source document, the machine intelligible language necessary for entrance into the system.

Manufacturers interested in submitting proposals for equipment are being provided with a list of units authorized to originate source documents together with a map of the installation giving the location of these units. This, together with the specifications for the required file, processing, and output will delineate the systems requirements and at the same time leave them relatively free to adapt the capabilities of their special equipments to the overall problem.

The selection of equipment will be based upon an evaluation of how well the various types of systems proposed meet the requirements of the task force's system and objectives together with the maximum in effective and economical operation.

It is anticipated that the selected equipment will be installed at Fort Meade by October 1958. A period of approximately six months is planned for phasing-in the entire new system. When this system has been proven it is anticipated that similar systems will be installed in other Class I installations where workload factors indicate that such will be economically sound. It is felt by the task force that the criterion established for the new system will be sufficiently applicable to other installations that the designed system can be applied with a minimum of work and effort, except in the establishment of workload factors and the analysis of any differences in requirements.

CONCLUSIONS

The experience of the task force and the results of their study has led to the following conclusions:

Data Processing problems at Class I installations are sufficiently similar to require only a minimum effort to extend and apply the study conducted at Fort Meade to other Class I installations; the main difference being in the workload factors and minor differences in requirements.

Procedures and techniques developed in this study are applicable to other studies for the application of electronic computers in installations and fields outside the Class I system.

Examination in new areas should be complete and detailed to determine what is being done, how it is being done and by whom; this must then be related to the requirements established by the end products.

The personnel best suited to make an investigation of this type are the personnel that are best acquainted in the various fields of interest, preferably with experience in analysis. The requirement for knowledge of computers and their capabilities can be taught these people without a great deal of effort or time; on the other hand, their knowledge of operations in various fields can be gained only through years of experience.

Maximum advantage of the capabilities of ADPS can be realized only through complete integration of the data processing system.

While it is anticipated that savings in personnel and money will result from this application, the main advantages will be derived from the increased accuracy and timeliness of processed information.

CLASS 1 INSTALLATION

AUTOMATIC DATA PROCESSING

RESULTS OF THE FEASIBILITY STUDY

* TOTAL CURRENT COST OF PROCESSING PAPERWORK $1,200,000

* MAJOR POTENTIAL COMPUTER APPLICATIONS:

1.	ITEM ACCOUNTING	$113,000
2.	MISCELLANEOUS LOGISTICAL SERVICES	87,000
3.	ARMY COMMAND MANAGEMENT SYSTEM	59,000
4.	MILITARY PERSONNEL STRENGTH SUMMARIES	55,000
5.	FINANCIAL INVENTORY ACCOUNTING	45,000
6.	FINANCIAL ACCOUNTING	34,000
7.	CIVILIAN PAYROLL	20,000
8.	STOCK FUND ACCOUNTING	16,000
9.	OPERATIONS ACCOUNTING & REPORTING	12,000
10.	CIVILIAN PERSONNEL RECORDS, ACCOUNTING & REPORTING	10,000
11.	R & U ACCOUNTING	4,000
	INSTALLATION TOTAL	$455,000

* ESTIMATED EQUIPMENT & PERSONNEL COSTS FOR ADPS RANGE $100,000 to $300,000 PER YEAR

* SERVICE CENTER—TYPE OPERATION FEASIBLE

Illustration 1

AUTOMATIC DATA PROCESSING - CLASS I INSTALLATIONS

S C H E M A T I C G R I D C H A R T

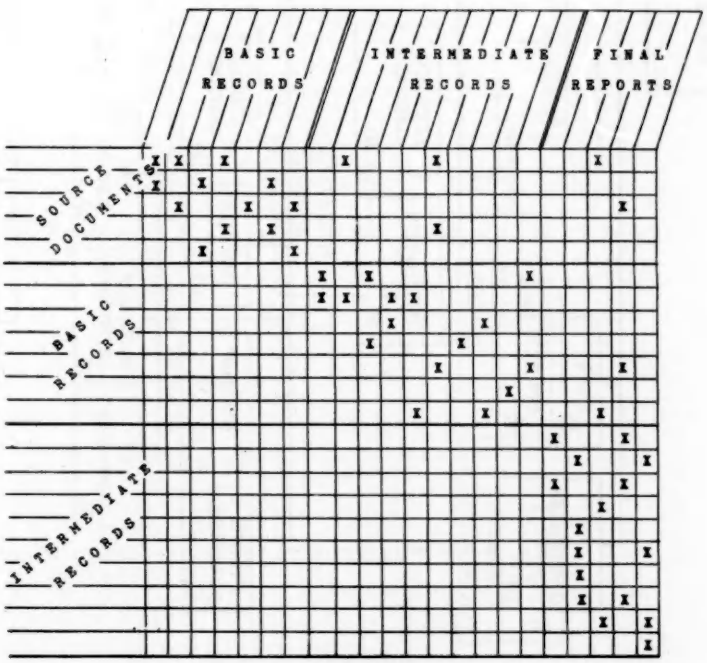

Illustration 2

AUTOMATIC DATA PROCESSING - CLASS I INSTALLATION
ENGINEERING STUDY

FORT GEORGE G. MEADE

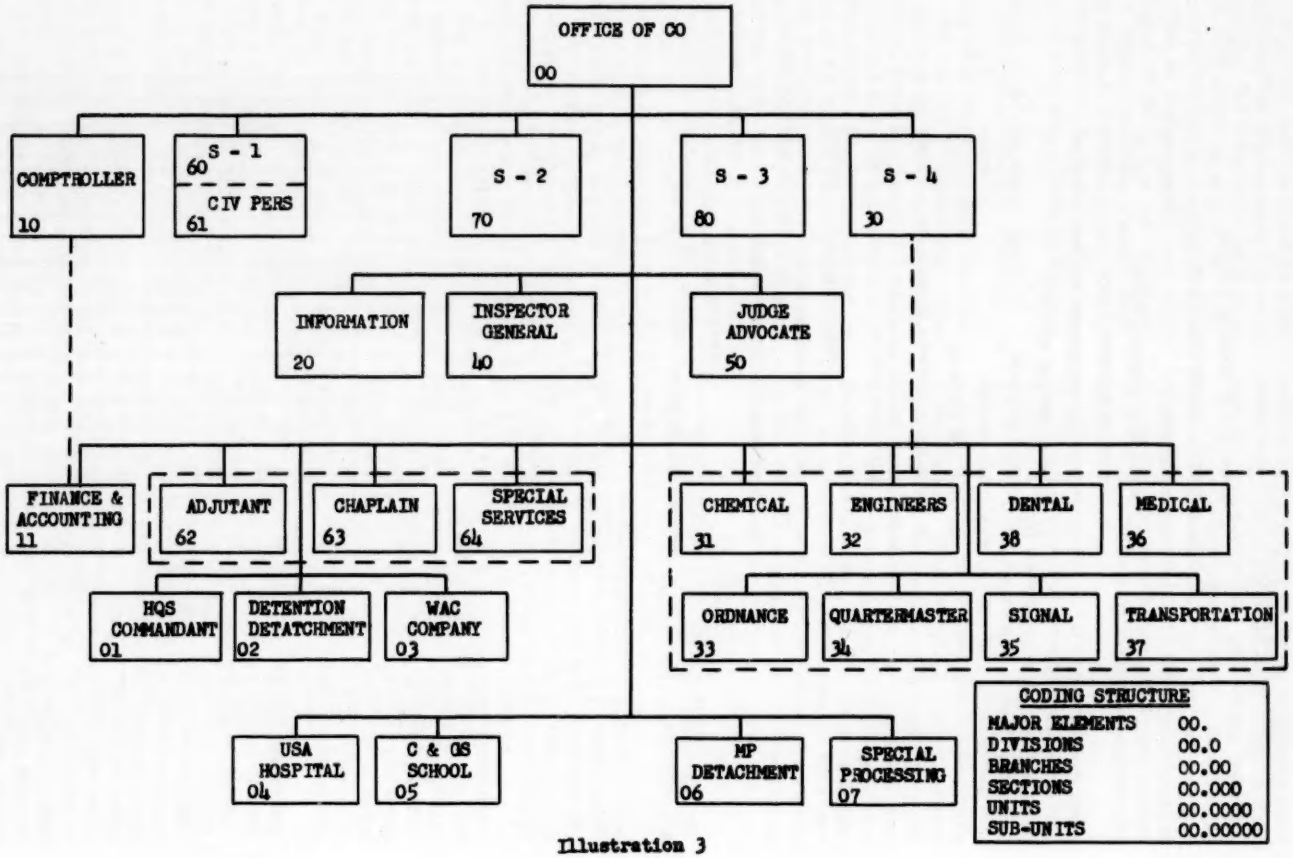

Illustration 3

AUTOMATIC DATA PROCESSING - CLASS I INSTALLATIONS
ENGINEERING STUDY

SEQUENCE CHART

ITEM ACCOUNTING - QUARTERMASTER

DA-446 Issue Slip

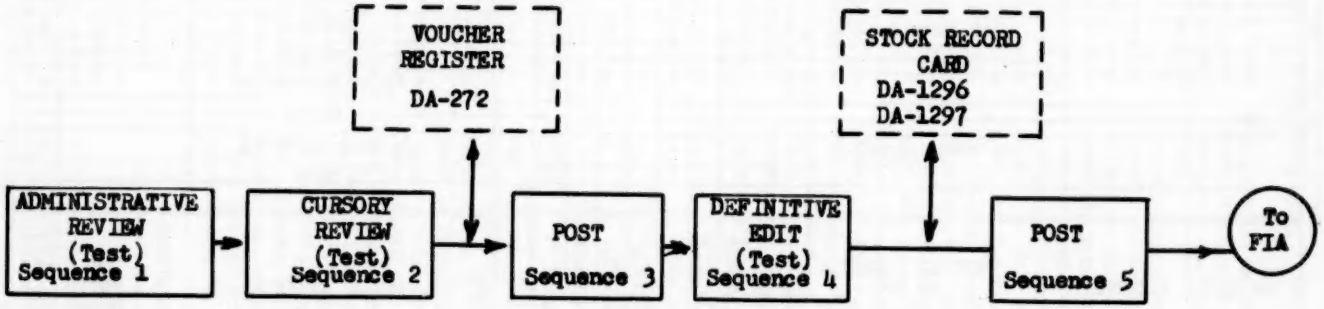

Illustration 4

AUTOMATIC DATA PROCESSING - CLASS I INSTALLATIONS

PROCESS CHART

MAJOR AREA Supply DATA PROCESSING ACTIVITY Item Acct DATE 1 June 58

SET OF DATA DA 1546 TYPE 0 ACTION Test SEQUENCE 1 OF 5 SEQUENCES TFM NO. 11

ORGANIZATIONAL ELEMENT QM, Property Div, Supply Br ORGANIZATION CODE 34.61 PAGE 1 OF 6 PAGES

LINE NO.	RESULT: FROM LINE NO.	RESULT: CONDITION	ELEMENT OF DATA	CLASS	ACTION: COPY	ERASE	DISREGARD	RECORD	COMPARE	DIVIDE	MULTIPLY	SUBTRACT	ADD	CODE	SET(S) OF DATA AND OR ELEMENTS OF DATA	AUTHORITY	CARD NO.
			COPY														
1			Stock or Part No.	1	X									20	DA 5-124 Stock No.		
			ERASE														
2			Approving Auth A			X								21			
			RECORD														
3			Station					X						23	"Fort Blank, USA"		
			COMPARE														
4		>	Tot. Adj. Amts. Cr.						X					24	DA 444 Tot Adj Amts Cr		
5		≠	Date Prepared						X					24	Blank Space		
6		=	Supply Branch						X					24	"Post Quartermaster		
			MULTIPLY or DIVIDE														
7			Adjustment								X			26	DA 444 Unit Standard Price		
8	7		Adjustment-Debit					X						23			
			ADD or SUBTRACT														
9			Total Cost A										X	28	DA 446-Total Cost		
10	9		Total Cost A					X						23			

Illustration 5

KNOW YOUR OFFICERS

Lieut. General Wm. S. Lawton, USA
Comptroller of the Army
National President of ASMC

William Stevens Lawton was born in Newport, Rhode Island, May 16, 1900. He was graduated from the U. S. Military Academy and commissioned a second lieutenant of Air service June 13, 1922.

He received ground school instruction and flying training at Brooks Field, Texas, from September 1922 to May 1923, when he was transferred to the Air Service Advanced Flying School, from which he was graduated in September 1923. He then was transferred to Fort Adams, Rhode Island, for service with the Coast Defenses of Narragansett Bay, where he became post exchange officer and recreation officer. In July 1924 he joined the 10th Coast Artillery at Fort Adams.

In February 1926, General Lawton was assigned with the 59th Coast Artillery at Fort Mills, Corregidor, Philippine Islands. Two years later he entered the Battery officers' course at the Coast Artillery School at Fort Monroe, Virginia, and in September 1928 was transferred to the Coast Artillery Corps. Upon graduation in June 1930 he was assigned to the 61st Coast Artillery (Anti-aircraft) at Fort Sheridan, Illinois, where he became Assistant Post Plans and Training Officer.

General Lawton was ordered to Fort Amador, Panama Canal Zone, in December 1932. He served there two and a half years as adjutant and plans and training officer of the First Battalion, as supply officer and intelligence officer of the Fourth Coast Artillery (Anti-Aircraft), as intelligence officer of the Harbor Defenses of Balboa, and as commander of D Battery of the Fourth Coast Artillery.

In July 1935, General Lawton became assistant commandant of the Ninth Corps Area West Point Preparatory School at Fort Winfield Scott, California. While there he served as assistant adjutant of the Harbor Defenses of San Francisco and of the Sixth Coast Artillery in May and June 1936. In September 1938 he entered the Command and General Staff School at Fort Leavenworth, Kansas, and was graduated in June 1939. He then entered the Chemical Warfare School at Edgewood Arsenal, Maryland, and completed the field officers' course in August 1939.

General Lawton was then assigned to Fort Ruger, Hawaii, as commander of Battery F of the 55th Coast Artillery and became Artillery engineer and ordnance officer of the Harbor Defense there. In March 1941 he was named assistant to the Assistant chief of staff for operations of the Hawaiian' Department at Fort Shafter, Hawaii, and became assistant deputy chief of staff in July 1942. A year later he was made deputy chief of staff of the Central Pacific Area, which position he retained when it was redesignated the Pacific Ocean Area on August 1, 1944.

In January 1947, General Lawton became a member of the General Staff of the Fifth Army at Chicago, Illinois. In August 1947, he assumed command of the Seacoast Branch of the Artillery School at Fort Winfield Scott, California. He was assigned to the office of the chief of Army Field Forces at Fort Monroe, Virginia, in January 1950, and became chief of staff the next month.

General Lawton was transferred to the Far East Command in November 1952 for duty as Deputy Chief of Staff, and later as acting chief of staff, Far East Command. In June 1953, he assumed command of the Korean Communications Zone, in which capacity he was responsible for the exchange of Prisoners of War under Operation Big Switch.

In March 1954, he was transferred to the Headquarters, Department of the Army in Washington as Budget Officer of the Army, which position he held until June 1957, when he was appointed to the position of Comptroller of the Army.

General Lawton was awarded the Distinguished Service Medal for his service in World War II as Deputy Chief of Staff, United States Army Forces, Central Pacific Area, subsequently Pacific Ocean Areas; Oak Leaf Cluster to Distinguished Service Medal for service in the Far East Command from November 1952 to March 1954; Legion of Merit for his work as Assistant Deputy Chief of Staff for Operations, Hawaiian Department; Oak Leaf Cluster to the Legion of Merit for service as Assistant Deputy Chief of Staff and subsequently Deputy Chief of Staff, Headquarters, Hawaiian Department, and as Deputy Chief of Staff, Headquarters, U. S. Army Forces, Middle Pacific; Bronze Star Medal for his service as Deputy Chief of Staff, U. S. Army Forces, Middle Pacific, in planning the invasion of Japan, and Army Commendation Ribbon for his service as Deputy Chief of Staff, Headquarters, U. S. Army Forces, Middle Pacific.

PROMOTIONS

He was promoted to first lieutenant April 8, 1927; to captain August 1, 1935; to major July 1, 1940; to lieutenant colonel December 24, 1941; to colonel August 26, 1942; to brigadier general September 6, 1944; to major general June 20, 1951; to lieutenant general July 1, 1957.

ANNUAL ACCRUED EXPENDITURES

Lawrence E. Chermak
Counsel, Office of Comptroller
Department of the Navy

Over two thousand years ago a prominent Roman general crossed the Rubicon and was reputed to have said Veni, vidi, vici --I came, I saw, I conquered. I wish the problems which underlie the effort to put appropriations under an accrued expenditure control could be solved that simply. Perhaps the lesson of history that such a solution will lead to an early destruction by one's friends has led some of us to hesitate. Yet the imminence of the passage of the amended H. R. 8002 in the Senate requires a consideration of the difficulties that must be resolved in the implementation of this legislation. If simple words of action would exemplify the considerations before us, they probably would be--I ordered, I received, I used and I paid. In a more sophisticated sense they could be stated as--I obligated, I incurred an accrued expenditure, I incurred a cost, I made a disbursement. As simple words they describe the acts which give the abstract concepts of accounting their meaning.

If the simple acts all occur in the same fiscal period very few problems arise, for it does not matter which act you consider significant. When the acts occur in different periods, then the significance we attach to the action can determine whether or not the difficulties we are seeking to resolve can prove troublesome. So let us take each act one at a time and by our analysis see where they lead us.

ORDERS – OBLIGATIONS

If I order, I obligate. If I contract, I also obligate. If I do the many events defined under the famous Section 1311 of the Supplemental Appropriation Act of 1955, I obligate. At least I establish an event which permits me to record an obligation. The act of obligation is the event which initiates a relationship which establishes a plan or pattern of disbursement necessary to satisfy the liabilities which flow from the obligation. Businessmen who do not use this device for introducing the event which triggers off the establishment of a potential liability prefer to wait until the liability has materialized by the event of delivery. Then an asset is created and a payable is established. For this reason, accountants of the commercial world look with distain upon the obligating event. However, those of us who are conscious of the controls necessary to manage the public funds can smile tolerantly at this naivete.

The act of obligating must be preceded by an appropriation or a contract authorization. This act is essential to the whole procurement process of the Defense Department. It must be realized that if any legislation changed the form of the appropriation so that it does not authorize the right to obligate but merely confers the right to withdraw money from the Treasury, then the right to obligate must be found in contract authorization. This is basic and those who stated that appropriations on an annual accrued expenditure basis would eliminate the 70 billion dollar carryover of obligating authority did not appreciate this.

OBLIGATIONS
70 BILLION DOLLAR CARRYOVER

I use the term obligating authority when I refer to the 70 billion dollar carryover at the beginning of fiscal year 1958. An examination of the balances available at the beginning of fiscal year 1958 shows that about 24 billion of the 70 billion consisted of balances in revolving funds, contract authorizations and authority to expend from debt receipts. Only the remaining 46 billion would be affected by a shift to the annual accrued expenditure basis. Of this amount, 34 billion was obligated and would be supported by contract authorization and still be carried over. Of the remaining 12 billion, about 10 billion is covered by unexpended and unobligated funds of the Department of Defense. About 5 billion of these funds would be obligated under pre-1311 standards. They are obligations covering spare parts and other contingent liabilities, but are not recordable. The remaining balances comes close to equalling the commitments carried over in the Defense Department Financial Plan for early obligation in the first two months of the year before the procurement moneys are apportioned by the Bureau of the Budget. Fortunately, the nonexistent problem of the carryover of obligational authority has been put to rest under the Wigglesworth Amendment to the original H. R. 8002, which amendment permits the current appropriation structure to continue.

OBLIGATIONS – APPORTIONMENT

Under Section 3679 of the Revised Statutes, it is necessary for the executive departments to submit apportionment requests to the Bureau of the Budget in order to establish the tempo of obligation and expenditure in the quarterly periods of the ensuing fiscal year. This tempo is established in terms of the authority to obligate. If the appropriations were made on an annual accrued expenditure basis and it became neces-

sary to segregate obligating and expending authority, it would require the submission of two apportionments– one for the control of contract authorization and the other for the control of accrued expenditure authority. The establishment of an accrued expenditure limitation has eliminated this double burden. It is a mixmum which limits the action of obligation to a pattern of unfolding deliveries which are not in excess of the established maximum. This is a simple proposition until it becomes necessary to determine what obligation offended Section 3679 of the Revised Statutes – the delivery under an early incurred obligation or the delivery under the last incurred obligation in those cases where the overdelivery occurs on the same day. Is it the time of receipt on the truck or the time of unloading that marks the overdelivery? This impossible aspect of control will be considered when we discuss the simple act of receipt.

OBLIGATIONS--EXISTING APPROPRIATIONS

Whether or not appropriations were made on an annual accrued expenditure basis, obligation accounting would not be eliminated. It would continue in the guise of control of contract authorization. This would be necessary since a control of the utilization of contract authorizations both in terms of the creation of obligations and expenditures in liquidation of contract authorizations is required. The requirements of Section 1311 reporting would continue in order that the test of proper creation of obligations would exist. It was not clear whether the funds continued under P.L. 798 of the 84th Congress would retain their full obligating and expending authority. The Wigglesworth Amendment put to rest this dilemma by continuing the present appropriation structure, even though the limitation created relates solely to the appropriations sought and not to those lapsed and available for expenditure. A further dilemma in regard to the treatment of the return of funds in one annual period for overpayments made in another annual period has been resolved by preserving the current appropriation structure.

RECEIPT
ANNUAL ACCRUED EXPENDITURES

The secret of accrued expenditure recognition lies in the simple act of the receipt of goods and services. The triggering event is, I receive. This is made very clear in the GAO Manual and in the Bureau of the Budget Circular A-34 – but not in H.R. 8002, either in its original form or in the Wigglesworth amendment. The purists for accrued expenditures hesitated and polluted their doctrine by including the results of the simple act of "I paid." Advance payments were included in the definition of accrued expenditures in both versions of H.R. 8002. This obviously was wrong, for even the GAO Manual and Circular A-34 say so. Again we find ourselves in a dilemma, i.e., recording an accrued expenditure when we perform the simple act of payment (advance payment) and not recording an accrued expenditure when we receive the goods covered by the advance payment. This also places in the hands of the executive branch a device for assuring that the accrued expenditures will attain the maximum permitted. The acceleration or deceleration of advance payments could make certain that the projected figure is attained. Progress payments could be treated similarly as a device for balancing out an accrued expenditure limitation.

RECEIPT – IS IT SIMPLE

I receive is a simple recognizable act until you say that it becomes the measure of a liability created by the receipt of goods and services. The time of receipt becomes important as it defines when you set up the account payable. The mere setting up of accounts payable for millions of transactions is no easy feat in itself. It probably means that dozens of regional offices must be established to process the vouchers covering the act of receipt of goods and services. When does this occur? The answer is simple--when title passes. The next question is not so simple to answer. Texts many inches wide are devoted to the question of when title passes. A mere recitation of delivery terms such as F.O.B. plant, F.O.B. carrier, F.O.B. destination, suggest the problems surrounding the simple act of receipt.

RECEIPT – PROGRESS PAYMENTS

Title to the goods allocated to the contract passes to the government when progress payments are made under a contract. This title covers all material, work in process, inventories, special tooling, nondurable tools, jigs, dies, fixtures, molds, patterns, taps, guages, drawings and technical data. The cost of all of this property is in excess of the progress payments made which is measured by a percentage of the total costs. Some well recognized industrial accountants have established the total costs as receivables based on full passage of title even though only a percentage of the costs is payable when the progress payments are vouchered. Does this receivable on the contractor's books require the recording of a payable on the government's books? It becomes obvious that the simple act of receipt is not simple any more. When it is remembered that these events which are difficult to measure as they occur must be budgeted for on estimates having their origin months before the simple act of receipt occurs, then the harshness of this type of control becomes apparent. It must also be remembered that the current appropiration records of the military departments do not show accrued expenditures and will not be able to afford the statisticians with the

historical data so necessary in any projection of future expenditures, cash or accrued.

RECEIPT – BUDGET PREDICTION

Not only is procurement prediction complicated by the requirements of progress payments but other factors such as advance payments, cost reimbursement, rapid or slow price redetermination and production slippages enter into the evaluation of accrued expenditure requirements. As stated above, this control and prediction cannot be obtained where no historical data basic to statistical control and prediction does not exist. It becomes obvious that the test of future receipt must be tied into the current acts of payment. Why not employ a cash payment as a control device rather than measure the tempo of obligation liquidation by a haphazard delivery criteria? Cash expenditure controls are slowly evolving means of prediction. The injection of new and unfamiliar data will only make the present burden of expenditure controls even more intolerable and unworkable. Those of us who have struggled with the difficulties found under current cash expenditure targets know that the additional burden of accrued expenditure controls based upon a hybrid concept of receipts and payments will only further confuse appropriation practices. It must be manifest by this time that even before these problems can be resolved the mere task of getting the personnel to satisfy the budgeting, accounting, reporting and procurement needs under this legislation will in itself retard its implementation considerably.

Budget prediction is closely related to the planning of programs tied into projected weapon systems. The greater the complexities and refinements in this area, the further extended will the planning time covering these weapon systems be. At present, the lapsed time for American weapon systems has been stated to be twice the time required by the Russians. This would suggest that fewer financial strait jackets are in order and that greater flexibility must be found in the use of money such as given by transfer authority, both within limitations and appropriations. The ridiculousness of extended control must be recognized when one must not only correlate a high priority program with an established obligation rate, a projected commitment rate, an expenditure target, but also an accrued expenditure rate and possibly a cost accrual rate. It must also be recognized that the control of receipts of goods and services for one year out of many is not a measure of the type of control which could be sensibly applied to an appropriation which covers the receipt of goods and services over many years. Under these circumstances, it would be better to use the simple device of payment which measures the rate of exhaustion of the fund established to support the cash flow requirement under an extended procurement action. More will be said in regard to this in the later discussion of the simple act, "I pay".

USE – COSTS

The third act which gives our accounting concepts meaning is, "Iuse". Usage establishes costs. Usage of goods and services independent of receipt and payment becomes the measure of what period should be charged with the money amounts theretofore or thereafter paid for the goods and service used. This assignment of cost to a period of operations is most important to private industry. The acts of receipt and use are important primarily because they permit the greatest refinement in the assignment of revenues and expenses to a period. This results in a finer computation of the profit for the period as an index of equity's share of the business effort in that period. Obligating and payment have no similar counterpart in private enterprise. These acts are important in the control of public funds so that management can make certain that the usage of the cash asset is in accordance with the proper purpose, during the proper time and in the proper amount. There is rarely a similar dedication of a cash fund in industrial practices. Yet, the cost controls of industry which find their motivation in profit measurement have some value in establishing a cost based public budget under an accrual accounting system.

This last statement may make my readers wonder why I have expressed such antagonism to the annual accrued expenditure basis of making and controlling appropriations. The answer may lie in the following anecdote: It seems as if two stalwarts imbued with the fervor of their mission were baptizing a young miss in the river. As they dunked her for the first time they asked her if she believed. Vigorously she replied, "I believe". Again they dunked her with great vigor and asked her if she believed. With enthusiasm she replied, "Yes, I believe". For the third time she went under with the same question as to her belief. But this time she replied, "I believe you two bucks are trying to drown me". This does not mean that she is against baptism, but too much of a good thing can be bad. To impose the requirement of accrual accounting and cost based budgets under P.L. 863 of the 84th Congress is in itself breathtaking. To follow these requirements with appropriations on an annual accrued expenditure basis may be more than the accounting, budgeting and reporting machinery of the Department of Defense can safely assimilate. Accrual accounting can show the effects of receiving and using goods and services without, at the same time, injecting the complexities of this mechanism into the mechanism of fund control. The results of reporting under a system of accrual accounting can be the determinant of the amount of funds which should be made available in a particular period to accomplish the purposes sought under a cost based budget. But once the fund is established, it

should be controlled in terms of its make-up; namely, on a cash basis.

COSTS – PRIVATE AND PUBLIC

In determining costs, usage of all assets during the cost period must be considered and evaluated. When this concept is applied in industry, its application is consistent and thorough in all areas of cost accumulation. Fixed assets are readily recognized and depreciation rates can generally be ascertained. Facetiously (more or less) we can consider within these concepts the status of the Navy satellite, "Vanguard". This sphere could be considered a capital item having a life of ten years and capable of amortization over this period as it beeps its messages back to earth. Or when fate denies the sphere its intended orbit, it becomes a consumable in the period of its inglorious dissipation. Multiply this example manyfold by the instruments of war accumulating in the American arsenal and try to establish these items as consumables or as capital items having an assigned rate of depreciation or even obsolescence. A recitation of these items would soon show how futile this measure of assigned costs would be, and thus deny the use of depreciation. This, in itself, would negate the test of usage so sacred to the accumlation of proper costs. Even in so simple a cost as labor, exception is made to accruing earned annual leave, except in the case of industrial funds established under Section 405 of the National Security Act Amendments of 1949. And perhaps military pay may find its cost expression in the areas of usage and not be treated as a payment for status independent of usage. Funding of military pay has always been external to the funding of the costs of the function whose performance is being measured.

Like the test of receipt of goods and services, the test of usage can only be partial in a military complex financed by public funds. Within defined areas, such as measuring the application of inventory under cost based budgets, it can be most helpful. As a full test of accomplishment found in the profit and loss statement of private industry, it can be deceptive. It is not significant under an accrued expenditure limit. For receipt, and not use, is supposed to be the gauge in this area. This partial application of these acts of receipt and usage tends to disqualify these modes of control on an over-all basis. At most they can serve as disciplines in the areas of their most effective use. These deficiencies should be recognized when imputing the effectiveness of full accrual to the annual accrued expenditure limitation. The question is not accrual versus a cash basis, but partial accrual under shifting standards versus a clean cash basis for fund control.

PAY – BALANCED BUDGET

The annual budget of the United States which finds its expression through the General Fund in the Treasury is measured by the withdrawals made from the Treasury against the revenues deposited in the General Fund for such purpose. If these withdrawals are not greater than the revenues, the budget is in balance. Obligations do not form a part of this picture except as they generate disbursements during the current fiscal year. The significant act within this context is the simple act of paying. With this in mind, the requirement of a balanced budget becomes a financing requirement and has no relation to accrual accounting and cost budgeting. It is primarily related to the exercise of annual control over cash expenditures for the purpose of matching these cash expenditures against cash receipts. It is at no time a factor of true costs. There is no need to consider accounts payable outstanding for the purpose of considering cash requirements of a period prior to the liquidation of payables. The Government must concern itself only with its cash flow for both current operations and capital acquisitions for the ensuring fiscal year.

It is false to suggest that this fully funded pay-as-you-go practice of the Federal Government should be on an accrued expenditure basis to parallel the practices of private enterprise. Normally, no industry includes within its working capital requirements, based upon a cash flow chart, the costs of its capital acquisition. These capital acquisitions are generally financed from a fund created by the issuance of long term securities. The measure of security issuance is cash requirement in a period or periods of construction. The same considerations have been applied to state and municipal financing of capital items. Where capital expansion is established on a pay-as-you-go basis, the rate of expansion must of necessity be tempered by the anticipated receipts. It may even be argued that this tempering process should have no application to the Defense Department once a program of capital expansion (major procurement, military construction, research and development) has been dictated by the requirements of defense. Procurement and construction obligations have the effect of creating a fixed charge against the current year as well as subsequent years flowing from the fulfillment of a contract which cannot be controlled unless partial termination charges are made to cover production stretch-outs. In fact, the cash requirements which attach to the obligations made for these long lead items partake of the nature of charges as fixed and certain as interest charges against the outstanding debt. Ideally, expenditures against contracts should unfold at the most efficient rate of production of the end item and should not be subject to a particular expenditure control under the budget unless one is prepared to sacrifice efficiency and economy in order to obtain this expenditure control. In regard to major procurement, the only way that the Government can control cash expenditures is to cut back or slow down or cancel orders consistent with a maximum ceiling for

cash disbursement. Under such circumstances contractors will demand higher prices than they would under firm obligations which would permit them to unfold at the most efficient rate of production.

CASH EXPENDITURE CONTROL

For the past three years the Department of Defense has been extremely conscious of the cumulative effect in each fiscal period of the simple acts of payment occurring in the military departments. Cash expenditures targets have been established and reestablished. The task of expenditure control has been varied and shifting. Procurement practices and payment clauses have been changed. To be effective, all of the skills of management must be employed as each threat to the expenditure plan occurs. This requires extreme flexibility in the application of expenditure limits to particular appropriations. Such flexibility would not be present if the control were legislative rather than administrative. This would suggest that transfer authority, both as to limits and appropriation, would be necessary, or failing this, to establish a single overall limitation on the department as a whole. Within this limitation should be an escalating provision which relates to cost of living increases and similar factors that inflate the tax base as well as the costs under procurement contracts. This would place the expenditure control within the context of the forces actually operating at the time of its use rather than in terms of estimates made many months before the budget was adopted.

CONCLUSION

Many words have been said and written regarding accrued expenditures. Unfortunately, few of the people who have advocated the adoption of the proposed legislation have considered its value in terms of the simple acts of — I order, I receive, I use and I pay. Had this occurred, then few would be advocating the control of the act of paying by the events of receipt. A more direct approach uncluttered by the mechanism of property receipt would be to judge cash use by a cash flow projection. It is more understandable by the uninitiated and would avoid the utter confusion which attended the discussions surrounding the hearings and debates of H. R. 8002. Congress should consider the effect of its appropriations on the cash requirements of each of the ensuing years at the time it grants new obligational authority. Once the contractual wheels have been set in motion, the procurement process grinds forward like a massive juggernaut crushing all efforts to retard its inevitable flow of expenditures. Expenditure control is a matter for the executive branch. Expenditure review based upon cash reports, cost based budgets and other reports giving the full picture of the receipt and use of resources would be a matter for the legislative branch. Based on this review, Congress would intelligently establish, disestablish or reestablish an obligational authority which will result in expenditures closer to the requirements of a balanced budget, as well as satiate the appetite of the gods of the cold war.

ASMC CHAPTERS

1. San Antonio, Texas
2. Washington, D. C.
3. Heidelberg, Germany
4. San Diego, California
5. Hawaii, Honolulu
6. Wichita Falls, Texas
7. Paris, France
8. New London, Groton, Connecticut
9. Greater New York, New York
10. Chicagoland, Chicago, Illinois
11. Hampton Roads, Virginia
12. Pocono, Tobyhanna, Pennsylvania
13. Greater Philadelphia, Pennsylvania
14. Baltimore, Maryland
15. Indianapolis, Indiana
16. Fort Worth-Dallas, Texas
17. Seattle, Washington
18. Antelope Valley, Lancaster, California
19. Central Pennsylvania, York, Pennsylvania
20. Great Britian, London Area
21. Ryukyu Island, Okinawa
22. Southern Maryland, Waldorf, Maryland
23. Frankfurt A.M., Germany
24. Denver, Colorado

HUMAN RELATIONS APPLIED TO AIR FORCE COMPTROLLERSHIP

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United States Air Force

Chapter I

INTRODUCTION

This study is about the Comptrollers and other people who work in Comptroller major staff organizations thruout the Air Force. In studying these people, we will be concerned about their human relationships with each other and with other people; how their thoughts, sayings and actions might be changed to foster better performance.

A natural reaction to this preamble might be, "Why should we be so concerned about these people?"

To explain, leaders (or managers) have three prime resources with which to get their jobs done — people, money and materiel. Of these, the first, people, is accepted as the most important and the most critical. People give meaning to aircraft, to vehicles, to dollars. As to criticality, there are two concepts. Some individuals regard criticality as being quantitative. Those better informed add a qualitative factor. In it, they include not only technical skill but also the human ability to apply that skill effectively in a working environment.

Pursuing this matter further, let us move closer to the working environment. Teachers and students of human relations concur substantially with Harvard's Professor Roethlisberger on the following points:

a. An organization has two broad, major functions: (1) accomplishing a technical mission and (2) creating and maintaining satisfaction among its employees.

b. In carrying out these functions, an organization constantly strives to keep iself in balance. Challenging this balance are two kinds of forces: external (from outside) and internal (inside). The first is generally assumed to be related to the "mission" function; the second, to the "employee-satisfaction" function. In a military organization, examples of forces exerted from outside are: arduous preparation of annual financial plans to meet tight deadlines, limited manpower ceilings, insufficient assigned vehicles and adverse weather conditions. Examples of internal forces are: grievances, relatively low wages, uncertain hours of work, difficult personalities, and administrative incompetence.

c. These two major functions, with their respective forces, are interrelated and interdependent. When grieving, an airman is less effective than when happy. A shortage of manpower places pressure on those present to turn out more work per individual. Reduced manpower ceilings start rumors about a reduction-in-force. If effected, this reduction causes unpredictable horizontal and vertical shifts of the remaining personnel.

Therefore, we can say that an organization exists in a condition of dynamic equilibrium. Continually active external and internal forces bring changes which supervisors strive to control. How well an organization reacts to these forces is a measure of its efficiency in accomplishing its technical mission and in providing employee satisfaction.

An additional point warrants attention. It is that the techniques of managing (commanding or leading), in industry as well as in the military, have been changing in recent years. The older philosophy of "right, wrong, or indifferent, the letter of the law must be obeyed"; strict discipline; and the absoluteness of authority are being replaced by new ideas and practices more in tune with our democratic concepts. The latter are based on dignity and individual rights. People have learned that human beings will respond more affirmatively and productively when led not driven, when encouraged not chilled, when talked with not at.

We are now ready to proceed with the main body of this study. In it, the Comptroller will be viewed as the center of the many human aspects pertaining to the Comptroller staff agency. First, we will look at the Comptroller himself, as an individual. Then, he will be considered in the company of others — the Commander, the rest of the members of the Comptroller team, then the staff and finally the operating organizations.

Within these four categories, the Comptroller will be studied while at work. This approach should aid in making the study as realistic and as practical as possible.

Frequent reference will be made to "the Comptroller." Actually, this term should be understood in a collective sense, to include both the Comptroller and the Comptroller's employees. There really should be no dissimilarity between them as far as attitudes and behavior are concerned.

Chapter II

THE COMPTROLLER HIMSELF

Behind "Comptroller," one of the many blocks on organizational charts, stands an individual. Separated from his business machines, ledgers, charts and technical language, he is as

you and I. He seeks essentially the same things from life as we. He is motivated by similar driving forces.

In considering the human aspects of Comptrollership, we can't escape careful scrutiny of the Comptroller himself. While it cannot be measured precisely, there is no doubt that his personality is felt both by his own organization and by the total command he serves.

GAINING REAL AUTHORITY

Responsibility and authority to get his job done are delegated to the Comptroller by the Commander; are formally conveyed by assignment orders. These orders automatically give the Comptroller responsibility. But they do not give him real authority. They merely pin a badge of authority on him. Real authority comes only when the Comptroller has gained acceptance from the Commander and his staff associates. This status must be earned by performance.

In striving to earn real authority, an incoming Comptroller should seek to cultivate respect, confidence and esteem in the eyes and minds of the people around him. In short, he should sell himself.

Here, an interesting question arises. "What does the Comptroller try to sell?" Boiled down, he has two things to offer — himself and his services. Regarding the former, we should recognize that serious people confronted by serious problems seek counsel and advice from capable Comptrollers. And they much prefer meeting capability in a pleasant atmosphere. As to the latter, what the Comptroller sells must be based on considerations of utility to the person(s) served.

One newly assigned Comptroller did it this way. He started on a small scale. Deliberately, he selected a task which he knew he could do well, which he knew the Commander was personally concerned about, and whose solution would be accepted automatically by the Commander and the staff. Over the next few months, following that initial success, he made it a point to choose problems of increasing difficulty but which he knew he could solve effectively. A series of such successes went a long way toward gaining acceptance for him.

A caution is in order. Mistakes at an early stage can be costly. The Comptroller should be extremely careful in selecting these projects. Success should be assured at the outset.

Of vital importance in the acceptance process is a feeling of confidence. It also must be deserved. It stems from honesty, sincerity and capability, the lack of which are quickly spotted by other people.

Consider the Comptroller who made an overtime study for his Commander. Preliminary facts gathered showed that one organization's overtime rate had been higher than any other organization at the installation. Delighted with such a finding, the Comptroller sped to the Commander. By this premature, summary action, the subordinate Commander was injudiciously placed in a poor light. Later analysis of the reasons for his high overtime rate showed them to be beyond his control.

What of the hasty Comptroller? First, he lost valuable face with his Commander. In addition, he found the subordinate Commander's door closed to him in the future. Such damage can be almost irreparable. Also, the lack of confidence felt by one key officer can soon be transmitted to others.

Striving for confidence can be overdone. On the one hand, dealing in facts as they constantly do, Comptrollers should aim for a high order of accuracy. On the other, they must be honest with themselves and their customers to admit errors when they occur. No one is superhuman. A few misplays are understood by everyone. But the appearance of constant perfection creates suspicion.

In the same vein, overselling can be dangerous. Comptrollers should not sell services faster than are provided in the quality required. If oversold, employees may soon be taxed beyond their capacity and beyond the time available to solve problems thoroughly. Customers will develop the feeling that getting anything out of the Comptroller takes an inordinate length of time. Therefore, capabilities, time and selling programs should match.

A Comptroller will not be truly accepted as an active player on the top management team unless he exhibits the broad viewpoint of a top executive. Regardless of his primary technical background, for example, budget or analysis, he must accent those areas only as warranted in relation to the total fabric of his responsibility.

Further, since by the nature of his work, he cuts across the lines of every other staff agency, he must be especially tactful and cooperative. Not to be so arouses hostility and loses acceptance. He is also highly vulnerable in this respect because establishment of the Comptroller position came late in military history. For centuries, armed forces had existed, wars had been planned and fought without any felt need for Comptrollership as an organizational entity. Also, the relatively recent establishment of Comptrollership in the military services occurred with some opposition.

SECURING INFORMATION

A Comptroller, like other executives, needs to be nourished by information. Obviously, he cannot operate in a vacuum. He has to receive a wide range of information if he is to cover well the extensive domain his charter prescribes.

By the same token, the sources of his information must also cover a wide range. To name a few, there are regular and periodic

reports, field visits, conferences, meetings and other types of discussions, both formal and informal. The range of these discussions extends from formal appointments to ordinary bull sessions.

How well he does in coming together with news, digesting it, then translating it into action helps determine his effectiveness. He needs acumen in detecting leads. These leads must then be quickly appraised to determine their validity and potential. After that, in his follow-thru, he has to screen out what is usable.

Significantly, the information derived from reports, conferences, and group meetings is generally of a formal, material nature. Behind such information, there are often human factors which can be crucial. As a discerning listener and questioner, the Comptroller can draw out such factors. Frequently, he will hear things which do not correspond with what the speaker is actually thinking. Likewise, people will often do things which they really don't believe should be done. Careful thinking by the Comptroller will enable him to penetrate to the roots of these matters.

Such discernment can also be invaluable in solving problems, by uncovering the causal factors of difficulties. Too often, because of our highly pressurized administration, problems are "solved" by treating symptoms. As such, only temporary relief is provided. Later, similar aches and pains are felt again and again. Effective problem solving, by removing the causes, insures against recurrences.

THREE-DIMENSIONAL THINKING

These penetrating, discerning techniques must be habitual with Comptrollers seeking to gain the reputation for being able to solve problems quickly, well and decisively. In effect, their thinking and acting must be three-dimensional — just as long, as broad and as deep as they can make it. Here is a pertinent story related by Lt. Gen. C. B. Stone, III, while DCS/Comptroller, Headquarters USAF.

In Leningrad, early in the 18th century, a number of large rocks brought by a glacier from Finland had to be removed. A particularly large piece of granite lay in the middle of the main street. Bids were advertised for its removal. All proposals submitted by contractors were exorbitantly high because there were no mechanical means for removal, no hard steel for drilling or cracking the stone, and no explosives except inferior black powder.

Before the contract was awarded to the lowest bidder, an unimpressive-looking peasant appeared. He offered to move the boulder for a small fraction of the sum quoted by the other bidders. Authorized to go ahead, he assembled many other peasants with spades and they began digging a deep hole next to the rock. Then the rock was propped up to prevent it from rolling into the hole. When the hole was deep enough, the props were knocked out and the boulder dropped into its grave where it rests to this day. The rock was covered with dirt, and the rest of the earth was carted away.

The anecdote's moral is clear. The professional contractors were thinking only in two dimensions — horizontally moving the rock elsewhere. The peasant considered that but shrewdly went further by thinking vertically as well. He added depth.

BASIC DRIVING URGES

Possessed of a three-dimensional attitude and aiming for sound solutions to problems, what basic driving urges does a Comptroller need? Granted there are probably as many answers as there are answerers. The one I favor is premised on the concept that performance is the payoff.

First, he must be able to overcome inertia. Subscribing to the belief that the biggest room in the world is the room for improvement, he should search out deficiencies, then initiate action to correct them.

Second, once the corrective process is underway, he must, by his energy, keep the action moving briskly.

Third, he must be resourceful. No matter what the difficulties, he must find ways to achieve the desired results.

Finally, he must be tenacious. He must persevere in spite of difficulties, discouragement, or indifferences. The word "can't" should be outlawed from his vocabulary.

If these driving urges are kept dynamic, the wheels of accomplishment will keep turning. The efforts of each day will add up to cumulative progress. Theodore Rooevelt had this in mind when he said:

> It is not the critic who counts; nor the man who points out how the strong man stumbled, or where the doer of deeds could have done them better. The credit belongs to the man who is actually in the arena; who strives valiantly; who errs and comes short again and again; who knows the great enthusiasms, the great devotions, and spends himself in a worthy cause; who, at the best, knows in the end the triumph of high achievement; and, who, at the worst, if he fails, at least fails while daring greatly so that his place shall never be with those cold and timid souls who know neither victory nor defeat.

WORKING EFFECTIVELY WITH PEOPLE

Capping these urges is the ability to work effectively with people. This quality is the universal lubricant for getting the job done.

The principles to carry it out have been handed down over the centuries.

One broad generality is especially important. It is that Comptroller collaboration with others should travel a two-way street, paved with mutual service. To seek information constantly without giving in return will not survive the test of time. Applying this principle of mutual service develops both parties, making them stronger, hence more competent to accomplish their respective parts of the command mission. To implement this principle, Comptrollers must: (1) understand others and (2) understand themselves.

Application of this principle will also aid in building teamwork, a vital ingredient for successful staff work. The need for teamwork is well recognized by most Comptrollers, who earnestly strive to achieve it. Unfortunately, however, the human aspects of teamwork are frequently overlooked or taken for granted, like the air we breathe. Faced by daily operating pressures, Comptrollers often see nothing but the material aspects of auditing, analysis, reporting, etc.

Taking a more scientific approach, all these material aspects are directly affected by people. Budgets do no work by themselves. People have to prepare them, justify them, and administer them. Too, people have to fill out time cards, initiate purchase requests, and submit reports. The actions of people are evaluated. People are asked "Why?" when situations are unsavory to the Boss' taste. People write letters and use telephones. People hire, promote and fire other people. People fail to forward enough suggestions. People are late to work. People jump channels. And so on and on, ad infinitum, ad libitum.

In view of the major role played by people in daily administration, Comptrollers should give greater weight to the human aspects of their operating problems. Somehow, time must be found to deal with them effectively, using them as points of reference for all planning and executing. To do so will encourage releasing the latent talents and energies of their employees and staff associates, making the wheels of accomplishment turn faster, in a more personally satisfying manner.

PROMPTNESS

In handling the many problems that are incessantly thrust upon the Comptroller, the factor of promptness is also important.

Basically a form of courtesy, it observes the principle of mutual service. Also, worthwhile work projects left to wither on the vine help neither the Comptroller nor the organization being supported.

Humanly, high dividends accrue to a small investment of promptness, in expressing appreciation for a favor, in commending an individual for a difficult job well done, in arriving on time for meetings, in remembering birthdays, and in answering correspondence, both official and unofficial. In fact, so few people are prompt in answering letters that the individual who does so automatically stands out favorably in the recipient's mind.

The other side of the promptness coin is worth looking at. Being too prompt can sometimes result in hasty, arbitrary, or subjective action. But if abnormal time is required, the person primarily concerned should at least be advised that the matter has been received, will be tackled, and an answer provided by a certain date.

In addition, there is usually never enough time in each day for the Comptroller to complete all his work, leaving a completely empty in-basket. It isn't physically possible to take care of everything. For this, there is only one answer. The Comptroller, as a habit, must budget his time, handling work in the order of its urgency. But nothing, regardless of its original priority, should suffer slow death. Eventually, it should assume sufficient priority to be completed.

Therefore, as with so many other things, promptness is relative. A dividing line must be determined between deciding too quickly and sitting too long. This can only be resolved on the basis of judgment in each situation.

TIMING

Allied to promptness is timing, an art in itself. It is a personal quality desirable not only for Comptrollers but for all in plying their tasks — in executive world, on the labor front, in sports, in teaching, in military campaigns.

Time was a key factor employed by General Eisenhower in planning and executing invasion of the Continent. When would the Allies attain air supremacy? When would the tides and the weather be the most favorable? When would Allied troops reach the optimum degree of training, to be neither under-trained nor over-trained. In the field of sports, the importance of sharp timing is clearly evident. One has only to remind himself of the spectacle of a brilliantly executed football play, of a batter driving a fast ball out of the park, of a boxer jabbing and dancing away from a heavier opponent.

As a vital ingredient in making effective decisions, timing itself can be divided into two elements — foresight and insight. Because of the nature of his work as a consultant and advisor, the Comptroller should develop these faculties.

As an example of foresight, let us consider preparation of the annual financial plan, a harrowing experience in most commands. Comptrollers need not wait until the call is actually sounded to go into action. Well in advance, the Comptroller should sense approximately what

will be required and over what period of time. What monetary and manpower ceilings will the command probably have to live within for the fiscal year being budgeted for? About when will the budget instructions be issued? What will be the deadline to deliver the financial plan to higher headquarters? What budgeting factors can be developed now? What preliminary work should be accomplished within the Comptroller staff agency now so that operating organizations can be spared highly pressurized requirements later?

Other examples could be provided. They would all point to the same beneficial results of good foresight — more time in which to plan for a new situation, greater freedom of action and better execution.

It should be stated here that foresight adds to a Comptroller's administrative competency as it does to the tactical proficiency of the commander on the field of a battle. Outstandingly successful tacticians have made it a point never to be surprised by the enemy. By constantly looking ahead, they have always been ready to handle any situation thrust upon them. In effect, solutions were conceived before problems arose.

Similarly, as a collector, analyzer, and interpreter of facts concerning the command, the Comptroller can lead other members of the top management team toward readily manageable waters, away from the rapids. In short, effective Comptroller foresight can go a long way toward helping organizations take situations in stride rather than facing a series of crises.

The other element of timing — insight — possesses more psychological characteristics. In working with and thru people, Comptrollers can help themselves by striving to understand not only what their associates say and do but also what they are actually thinking. In acutely comprehending what people are thinking, one has knowledge of basic, causal factors. To stop at observing what people say and do often provides only symptoms. Frequently, people say things not in line with their thoughts. Equally obvious, people sometimes do things on an emotional basis, opposed to what rational reasoning tells them should be done.

Take for example the Comptroller who had just completed a special report for higher headquarters. While there was no doubt of the report's essentiality, the manner in which it was administered by his higher command headquarters left much room for improvement. By toying with the problem too long, higher command headquarters had to impose a tight deadline on the lower echelons. In addition, since the higher command's original instructions were neither clear nor complete, time was lost in obtaining final clarification. As a result, considerable overtime was required and the Comptroller found himself faced by many harried, upset people.

To prevent recurrences of a similar nature, the Comptroller decided to talk the matter over with his command counterpart. Having carefully studied the latter beforehand, he arranged for a meeting at the best psychological moment. He was able to tactfully point out what had gone wrong and what would be advisable in the future. Regardless of how tactful he was, he could not have succeeded so well had he not known a great deal about how the higher command Comptroller thought and acted. Specifically, the higher command Comptroller seemed to thrive on emergencies, was not inclined toward detailed planning, habitually took off like a shot, and was not an effective writer.

The good results of this discssion were far-reaching, going beyond the reporting function to other functions as well. From then on, because of this application of insight, the Comptroller (and his entire organization) was given more time, plus clearer and more complete instructions on higher command-directed tasks.

MAKING DECISIONS

Someone has aptly described administration as "one damned thing after another/" This definition certainly applies to Comptroller work. In a sense, it could be said that a Comptroller's life is a succession of decisions. His effectiveness in making these decisions goes a long way toward determining the nature and value of Comptrollership to the command.

Like the other men on the top-management team, the Comptroller works in an environment of change and uncertainty. Military personnel are often transferred, grievances pop up unexpectedly, annual budgets fluctuate within the year, supplies run short, inspections reveal deficiencies, and higher headquarters summarily direct program changes. When these and myriads of similar developments occur, decisions have to be made to keep the wheels of administration turning.

The ability to make sound, clean-cut decisions promptly is definitely to be sought by Comptrollers. Possessed of it, the wheels do turn smoothly and subordinates are given a clear view of how the Comptroller job should be done.

To some executives, making decisions is a highly complicated and arduous mental strain. The process takes an inordinate length of time for them. They fear being wrong. At times, they do not realize that an early decision is called for. Often, they fail to consider all interested parties and issues. As a result, this inability to properly cope with decision-making situations breeds lack of confidence, prompts feelings of frustration, and brakes progress. Organizational paralysis sets in. This need not be so if a few basic considerations are applied.

First, the Comptroller must insure that he has all the important facts relevant to the

problem. Not having them, he should refrain from snap judgments. This calls for self-discipline. Realistically, however, we know that there are occasions when all the facts cannot be made available in time. If a decision must be made, the Comptroller should face the situation squarely and decide.

Second, the Comptroller should always consider his decisions in the light of what happened in the past plus what is likely to occur in the future. Decision making should never be restricted to the present. Of the two in this process, the future is probably of greater importance. The past is a fait accompli. Nothing can change it. But the future is shaped by today's decisions.

Next, if all the important facts are available and the Comptroller is still unable to decide which way to go, it is probable that the net difference in the alternatives is small. In such cases, a decision should be made promptly. If later events prove it to be wrong, adjustments can be made.

Finally, issues should not be straddled because of subjective personal feelings. The Comptroller should realize that it is humanly impossible to please everyone. After logically and objectively studying the problem, a decision should be made. However, before announcing it, the Comptroller should consider its effect on the people concerned. Wherever possible, the blow should be softened by talking it over with the other parties, mainly to point out its advantages. Therefore, the courage of one's convictions should be tempered by an understanding of the others' feelings.

Basically, no anxiety need be felt if decisions are made from logical, objective thinking. They will usually stand the test of time. If they don't, the reasons why will be understood and accepted by mature, thinking associates.

FOLLOWING THRU

A decision having been made, the Comptroller cannot assume that his instructions will be carried out and results attained exactly as he had in mind. The implementing instructions may not have been clear. A dissenter in the group that made the decision may be dragging his feet. All the necessary resources may not be available. Perhaps the decision itself was theoretically sound but not practically workable. These are only a few of the conditions which might prevent the decision being carried out as desired by its maker.

To guard against such conditions, the Comptroller should follow-up after a reasonable length of time. He can request regular progress reports from those responsible for implementation. These can be oral or written. By personal observation, he can check up at the scene of the action. Or he can dispatch an emissary to observe for him. These are the main methods which can be used to follow up. The particular one used is a function of judgment based on the situation. The essential point is that once the Comptroller has assigned responsibility, he should keep himself reasonably informed of progress, or lack of it. By so doing, he is able to catch difficulties before serious damage occurs and can apply preventive maintenance.

COMMUNICATING EFFECTIVELY

In carrying out his responsibilities, the Comptroller must communicate with others. He does it orally or in writing, or both. To conserve time, most of it is oral.

As a busy individual, among many busy individuals, the Comptroller should strive for conciseness and clarity in his oral and written dealings. In substance, he should attempt to convey the maximum amount of significant information in the minimum time. In addition, he should use words that will be understood as he desires them to be.

Much improvement can be made in the way Comptrollers express themselves. Others, unfamiliar with Comptroller terminology, are confused by words like deobligations, open allotments, object classifications, overhead, undistributed charges, disbursements, and program analysis, to mention only a few that Comptrollers use in their daily work. Therefore, it behooves Comptrollers to be extremely careful in expressing themselves. Pains must be taken to insure audience-understanding as intended. Often, this can be achieved over a period of time, the result of a skilled training program. From experience, I have learned that other staff officers like to use Comptroller terms but only when they are sure of what they are saying. On the other hand, stabbing in the dark with such words can be embarrassing to the user when he does so incorrectly.

Vice versa, the Comptroller must also be able to accurately interpret what others say to him. Some of this is rambling, incoherent, or charged with emotion. Somehow, he must be able to clear his way thru this verbal underbrush so that he can come to grips with the main issue. As mentioned earlier in this study, he can do it by skillfully penetrating to the core of the matter, using keen listening and discerning questions.

WHY DOESN'T EVERYONE LIKE COMPTROLLERS?

What we have considered so far in this chapter has concerned the Comptroller as an individual at work. To complete our examination, let us view him as a target of aggression by his staff associates.

Personal experience, plus many interviews with both Comptroller and non-Comptroller people, has shown displeasure to stem from the following main factors:

a. A few Comptrollers are negativistic, primarily while administering the budget and controlling reports. They seem to prefer uttering a built-in "No," instead of trying to help the customer.

b. Many Comptrollers communicate in a strange language all their own. They make little special effort to be understood by the person talked to.

c. Comptrollers are special agents of the Commander, spot-lighting unsavory conditions for him.

d. Too many reports have to be filled out without knowing for what utility. Even though he is not the requesting agency, the Comptroller is blamed because he is assigned the function of reports control.

e. He is seen as the driver behind accounting, an ambiguous process that produces little apparent practical good. To him, an accounting report seems to be regarded as an end in itself.

f. As a result of his analyses, changes often have to be made. Since people generally do not like to have changes imposed on them, the Comptroller is resented as as the basic cause of the change.

g. Although he is primarily not an "operating" staff officer like those in Operations, Materiel and Personnel, he sometimes seems to be trying to run the show, armed with his wide knowledge of many aspects of the organization.

h. Some Comptrollers get lost in their own specialized work. They don't really try to understand the operations and problems of their associates in the staff and on the firing line.

i. After so many years of budgeting, preparation of financial plans is still a painful chore. It seems to be getting more difficult all the time. Higher headquarters want too much detailed justification. Comptrollers don't seem to be doing anything to correct this. In fact, they are often considered the cause.

j. In their analyses, including executive control meetings, Comptrollers expose weaknesses of other staff agencies. Rarely do they depict poor performance by the Comptroller.

A little study shows that these factors are all of a human nature. They can be corrected by Comptrollers willing to devote more time to develop their practical ability to deal with people. Their outlook must be less of a specialized, technical nature. It must be broad-gauged, emanating from a sincere effort to understand the other person's viewpoint and to be of service.

End of Section One

Section Two of Brig. Gen. Scheidecker's article will appear in the next issue of The Armed Forces Comptroller.

Plan now to attend the 2nd National Convention to be held in Washington, D.C., on Thursday and Friday, 23rd and 24th of October 1958.

DO WE NEED A REEVALUATION OF THE INDUSTRIAL FUND?

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Few recent innovations in accounting and financial management of the military establishment have attracted more attention — both favorable and unfavorable — than that method called the Industrial Fund. The idea of the Industrial Fund is, briefly stated, that the operations of so-called industrial or commercial type establishments be financed by a revolving fund which pays all costs of making a product or performing a service and which is then repaid, after completion of the task, from appropriated funds. Use of the revolving fund is accompanied by the introduction of double-entry, accrual accounting procedures patterned closely after those used by private industry.

This sounds unexciting. However, attempt to discuss this subject with several individuals familiar with it and chances are the experience will be a strange one. You will probably be told on one hand that the Industrial Fund introduces a new era of efficient business practices, and on the other hand that it is only a complicated accounting exercise under which costs become prohibitive; that it at long last allows government activities to use and benefit by the time-tested accounting and management methods of private industry, or that it merely superimposes an accounting system that doesn't fit on top of appropriated fund accounting requirements which have to be followed anyway. And among those who see merit in the idea there is lack of agreement as to where, when, and how the Industrial Fund should be used.

What's the truth about it? What advice should be taken by those responsible for efficient operation of these activities? Isn't it time, possibly, to draw up a balance sheet on the proposition, not only of pros and cons but also of wheres and whens, for the guidance of those making decisions?

It is the thesis of this paper that we in comptrollership positions haven't done a particularly brilliant job of advising our agencies when and how — or whether — to use the Industrial Fund, that new criteria regarding its use ought to be developed, and that reasonable criteria should command a high degree of acceptance. My suggestions follow, together with brief topical discussions of principal points frequently advanced as reasons for use of the industrial fund.

THE BUYER-SELLER RELATIONSHIP

One of the principal objectives of the Industrial Fund is to pattern the operation of government industrial-commercial activities (generally defined to include arsenals, shipyards, repair and rebuild depots, printing plants and laundries but to exclude research and development activities and supply operations) after those of private enterprise, and to introduce like incentives to efficient performance. Since the relationship between buyer and seller, or producer and customer, with the freedom of the customer to transfer his business elsewhere if price and service are not acceptable, is a prime incentive in private industry, an attempt is made to recognize this relationship where it exists or to simulate it to the extent possible where it does not exist.

Such a relationship does exist in many cases — arsenals, for example, which produce ammunition for all three services, and printing plants which do work for many agencies. Here an incentive not otherwise present is brought into play by use of the industrial fund. However, there are wide differences of opinion about what constitutes a buyer-seller relationship. Is the relationship between a major Command and a field installation under its control, for example, a buyer-seller relationship? Or is it more closely analogous to a home office — branch plant relationship? Here the activity, although it may be of an industrial nature, is seldom in a position to seek out sources of work other than those determined by the Command and can seldom control its own budget, schedules, or workload levels. Due to the complexity of modern weapons, the Command itself frequently has limited flexibility in assigning workloads since it may be prohibitively costly to provide the requisite parts inventories, labor skills, and specialized equipment at enough locations to permit "shopping" for the best price (lowest cost). It is difficult to find a customer relationship, either genuine or simulated, of sufficient importance to provide a new incentive, in this situation — and it is probably a more typical situation with respect to the military's major industrial establishments than any other.

It should be noted also that there is a third vital element, in addition to a buyer and a seller, in any normal commercial relationship. This third element is credit, and without credit the analogy to private industry is far from complete. The flexibility in planning and operating a business made possible by use of credit is necessarily denied these activities of the military establishment.

The balance sheet on this point? It appears to me that, while use of the industrial fund to provide incentive from the buyer-seller relationship is valid and useful where this relationship exists, both importance and applicability tend to be exaggerated. The easy assumption that wherever there is an industrial installation the buyer-seller relationship must exist, and justifies use of the industrial fund, appears naive. We should be careful and exacting

in applying this as a criterion of where and when to use the industrial fund.

SIMPLIFIED FUNDING

Military establishments are often financed by funds from numerous different sources — different appropriations, allotments, project orders, cross-servicing orders, etc. Each of these is a fixed limitation for a specified purpose, making it necessary to record every charge document as first an obligation, then an expenditure (and in many cases as a commitment in advance of legal obligation) for the purpose of insuring use of the funds only for the specified purpose and for preventing overexpenditure. This can become quite a complicated and rigid process. Under such circumstances the use of a working capital fund can simplify this process by permitting all charges (including overhead) to be made initially to one fund, allowing overhead to be administered flexibly and pro-rated to orders rather than charged to separate limitations, and charging appropriated funds by one total cost for each order.

Two notes of caution in this respect, however. In the first place, obligation information is of definite usefulness in control of funds (even private industry accounting is tending toward recognition of the value of such information, although it is not a part of traditional commercial accounting practice); and obligation data by source of funds is not obtainable under industrial fund accounting in the same detail or as promptly as under appropriated fund accounting. This appears to be a less-than-satisfactory aspect of industrial fund accounting vs traditional government accounting. In the second place, many of the military's industrial plants are financed principally by one or two allotments, not a multiplicity. It should be recognized that this can be actually a less complex method of financing than financing by working capital fund, which requires rather extensive accounting for the purpose of protecting the integrity of the fund.

The balance sheet on this point? Simplification in funding appears to be a major plus for the industrial fund in those circumstances where a complicated funding pattern would otherwise necessarily exist. This will usually be found to coincide with existence of a genuine producer-customer relationship, where each customer agency has its own funds. But the situation is different where a relatively simple funding pattern is possible, and here appropriated fund financing may be found to be both more flexible and less complex. Study each situation before giving a fast answer to this one.

THE PRODUCT

The philosophy that any activity which produces a physical product that can be identified and priced is a proper subject for use of the industrial fund appears to underlie many decisions with respect to its use. The converse of this is, of course, that an activity which does not produce an identifiable, priced product should not be financed in this manner. While not stated policy, recent application of this philosophy seems to have resulted in virtual exclusion of research and development activities from consideration for use of the industrial fund, since here the only "product" in many cases is the application of a certain amount of time, effort, and material on research in a given area or on a given problem, results uncertain. The theory of this is apparently that since these efforts can be programed in advance there is little point in accumulating costs before making a charge to appropriated funds.

It should be noted in this connection, however, that research and development activities tend to develop genuine customer relationships — several agencies may be interested in a certain type of research — and tend, because of this, to have complex funding patterns. If the industrial fund is really advantageous under these conditions, exclusion of research and development activities would seem inconsistent. Conversely, there are many examples of activities which produce "hardware" which have neither "customers" nor complex funding. And, in one way of looking at it, time and effort applied to research is no less a "product" than is an item of "hardware," even though the "product" is less tangible. It can be priced out just about as readily, in any event.

The balance sheet on this point? In my opinion, the decision to use or not to use the industrial fund should not be made on the basis of the presence or absence of a tangible product. The "product" criterion should be a minor consideration at best. Further, some of the most promising industrial fund applications are in research and development, without a "product."

CLIMATE FOR MANAGEMENT IMPROVEMENTS

A case is frequently made that use of such management and accounting techniques as engineered time standards, standard cost, operating budgets, and double-entry, accrual accounting is generally dependent upon, and follows, the introduction of the industrial fund. Historically, it is certainly true that these techniques (generally conceded to have merit when used properly and in the right place) have often awaited introduction of the industrial fund. And until recently, with the passage of Public Law 863, there was little basis for application of double-entry, accrual accounting outside the industrial fund.

The industrial fund movement must be given large credit for the relatively recent popularization of these new techniques in military

establishments. However, if one looks at the question objectively it is hard to discern a necessary relationship. These techniques all can be, and in certain cases have been, introduced and used without use of the industrial fund. Public Law 863 has now established a requirement that government accounting generally be on a double-entry, accrual basis, and procedures are being progressively developed to accomplish this. Appropriated fund accounting under P. L. 863 procedures can retain obligation accounting by fund authorization and can also avoid some of the complexities necessary to maintain the integrity of a revolving fund. These are both distinct advantages under many circumstances. Engineered time standards, standard cost, and operating budgets can obviously be used, when desirable, with either method of funding. Perhaps the time has come to concentrate on finding the best way of achieving the objective of improvement in financial management under each separate situation rather than insisting that salvation lies in one method or another.

The balance sheet on this point? In my opinion, it is rather generally true so far as history is concerned that the industrial fund has provided a receptive climate for management improvement. However, with increasing understanding and general use of various techniques, it is doubtful that association of management improvement with the industrial fund provides a valid criterion for the future. The decision to use or not to use the industrial fund should not be based on these peripheral considerations.

ACTIVITY FINANCING THROUGH THE PRICE MECHANISM

The thought here is that by providing appropriated funds to the installation via payment to the industrial fund after production has been completed and priced out (at cost), rather than on the basis of allotments granted in advance of production (with only cost estimate or staffing level information available), attention is more forcefully called to cost information and more incentive to reduce costs is introduced. This mechanism is also designed to compel adjustments in staffing levels as workloads increase or decrease, in particular to make it difficult to retain excess personnel when planned work does not materialize. Then either overhead cost will rise, and "prices" will rise with it, or separate funding for excess personnel must be provided (labelled, presumably, as idle capacity cost), calling attention to the situation in either case.

The administrator of the requiring appropriated fund is also presumably subject to greater "funding discipline" by having a price placed on his requirements on a product or service basis instead of using his funds to maintain a pre-planned staffing level. He can also compare prices with those from other sources, including commercial contract.

In my opinion this is an impressive argument for use of the industrial fund. It needs to be qualified in at least four ways, however. First, a good cost accounting system will produce the same information under any other type of funding, and action can be taken although it is probably true that inaction can be more easily ignored. Second, allotments or project orders must be given to industrial fund activities in advance of production, since there is no provision for credit, and cost estimates similar to those often used under conventional financing are necessary; they are not necessarily better estimates nor does the price mechanism necessarily result in better "funding discipline." Third, military readiness must be maintained — it is the reason for the very existence of these plants. Budgeted funds for idle capacity may not always be available; operations money frequently has to carry a certain amount of readiness cost. It may be unwise to establish a funding mechanism which would make this difficult if not impossible to accomplish. Fourth, there is little flexibility in hiring and firing under government policies — let's face it — and timely action dictated by a financing situation is frequently not possible. Under these conditions it is sometimes better business to maintain a constant staffing level and attempt to schedule work to keep this force profitably occupied than it is to try to vary the size of the force for short-term situations.

The balance sheet on this point? As I see it, financing through the price mechanism is a plus for the industrial fund under most circumstances, but seldom either a clear-cut advantage or an over-riding consideration.

FINANCING INVENTORIES

The working capital fund has the ability to finance the purchase and storage of production materials prior to use. Appropriated funds are normally not properly available for this purpose unless the materials are to be used in the fiscal year in which purchased, and are seldom available for extensive purchases for inventory. Stock funds are usually restricted to standard materials. Installations which use non-standard materials extensively may find use of the industrial fund highly desirable for this purpose.

The balance sheet on this point? A definite plus for the industrial fund at installations requiring extensive use of non-standard materials (many research and development activities, among others, do). A matter of little consequence at installations not having extensive non-standard material requirements.

FUNDING OF ANNUAL LEAVE

Under the industrial fund, annual leave of civilian employees can be accumulated as earned.

The problem of payment of accumulated annual leave from annual funds available at the time of separation of an employee is avoided.

The balance sheet on this point? A plus for the industrial fund, but usually a minor consideration. This may soon be possible under P. L. 863 procedures but is not at present.

SUMMARY

This is by no means an exhaustive list of pros and cons, but these seem to me to be among the most significant. To sum up, as I see it, the industrial fund should be considered for use when any of the following conditions obtain:

(1) a true buyer-seller or producer-customer relationship (not a home office-branch plant relationship), under which the producer can seek alternative sources of work and the customer has some freedom of choice of supplier, exists;

(2) a necessarily complex funding pattern exists at an installation, particularly when different funding agencies are involved;

(3) a definite need for extensive purchase of non-standard materials for inventory exists.

In my opinion, the industrial fund should seldom be used when these conditions are not present. Other considerations are secondary and should seldom determine the decision. Accounting improvements formerly possible only under the Industrial Fund Regulations are now possible, and will generally prove more adaptable, under P. L. 863 authority. Where not specifically needed for definite reasons, use of a working capital fund will prove burdensome rather than helpful and should be avoided.

Again, it is my thesis that the time has come for a reevaluation of this question, and that those of us in military comptrollership, including those who have performed notable service to date in promoting use of the industrial fund and other business techniques, should now consider alternatives and jointly develop criteria which will command a wider measure of agreement and support than any of the various sets of criteria now being somewhat indiscriminately employed.

KNOW YOUR OFFICERS

Rear Admiral G. F. Beardsley
U. S. Navy

Vice President of ASMC

George F. Beardsley was born in Arlington Heights, Illinois, October 26, 1907. He graduated from the U. S. Naval Academy and was commissioned an Ensign in the United States Navy June 8, 1929. He reported to the USS Lexington in 1929 and has spent his entire career in Naval Aviation. After designation as a Naval Aviator in January 1931, he served in Scouting and Fighter squadrons on both the USS Lexington and USS Saratoga during the early 1930's. From 1934 to 1936 was assigned to the Assembly and Repair Department at the Naval Air Station, San Diego. From 1936 through 1939 attended the Post Graduate School at Annapolis and received his degree of Master of Science in Aeronautical Engineering from California Institute of Technology. The following year and one-half he was senior naval aviator on the USS San Francisco. Served two years in the Overhaul and Repair Department at Jacksonville, Florida. From 1942 to 1944 was assigned as Assistant Fleet Aircraft Maintenance Officer on the staff of Commander Air Force, U. S. Pacific Fleet. For this duty he received a ribbon of commendation with authorization to wear the commendation ribbon. Following the war he served as Fiscal Division Director of the Bureau of Aeronautics for three and one-half years. He attended the Harvard Advanced Management Program. During the period 1949-1951 was Director for the Naval Air Experimental Station at the Naval Air Materiel Center, Philadelphia and for one of these years served as Manager of the Naval Aircraft Factory. He served as Director of the Production Division of the Bureau of Aeronautics from 1951 to 1954. From 1954 to 1955 was in charge of the Overhaul and Repair Department, Alameda, California. Most of his career has been spent in the logistics and business end of Naval Aviation.

In August 1955, was assigned as Assistant Chief, BuAer, for Procurement, Navy Department.

In February 1956, was assigned as Assistant Comptroller, Director of Budget, Navy Department.

In May 1958, was assigned as Deputy Comptroller, Navy Department.

MARINE CORPS SMALL BUSINESS PROGRAM

Major Earl C. Dresback, Jr., USMC

It is the declared policy of the Government that a fair proportion of the total purchases and contracts for supplies and services for the Government be placed with small business concerns.

The philosophy underlying this policy is best expressed by Section 202 of Public Law 163 of the 83rd Congress, as amended, which states: "The essence of the American economic system of private enterprise is free competition. Only through full and free competition can free markets, free entry into business, and opportunities for the expression and growth of personal initiative and individual judgment be assured. The preservation and expansion of such competition is basic not only to the economic well-being but to the security of this Nation. Such security and well-being cannot be realized unless the actual and potential capacity of small business is encouraged and developed. It is the declared policy of the Congress that the Government should aid, counsel, assist, and protect insofar as is possible the interests of small business concerns in order to preserve free competitive enterprise, to insure that a fair proportion of the total purchases and contracts for supplies and services for the Government be placed with small business enterprises, and to maintain and strengthen the overall economy of the Nation." This philosophic preamble sets forth the principles which motivated Public Law 163 of the 83rd Congress.

This legislation, in addition to serving as a mandate to all agencies of the Government, created a separate and independent agency, the Small Business Administration (hereafter referred to as the "Administration"), which performs services wholly intended to carry out the spirit and intent of the law itself.

While this legislation sets forth many areas and types of assistance to be furnished to small concerns by the Small Business Administration, this writing will only concern itself with those which pertain to, or are connected with procurement procedures and practices. The Administration is empowered to enter into contracts with the Government or agencies thereof having procurement authority to furnish articles, equipment, supplies or materials to the Government, and to arrange for the performance of such contracts by subcontracting to small business concerns for the items to be furnished.

The Administration has the exclusive authority to make a detailed definition and determination of which firms shall be classified as small concerns within the meaning of the law, and further has the authority to certify to Government procurement officers with respect to the competency, as to capacity and credit, of a small business concern or group of such concerns to perform specific Government procurement contracts. Such a certification is conclusive and contracting officers must accept it.

Section 214 of the Act is the basic authority which allows contracting officers to reserve procurements, or portions thereof, exclusively for participation by small firms.

It is readily apparent that the Military Services, while not required by law to perform specific acts or services directly for small business concerns, must carry out a program of assistance in order to comply with the intent and spirit of the law. The Congress has from time to time enacted or amended necessary legislation to permit the various agencies to do this in a practical manner.

The Marine Corps Small Business Program accents assistance. It is designed to give every practicable assistance to small firms to enable them to participate in Marine Corps procurements without unnecessarily and unduly restricting or delaying the procurement process. In the Marine Corps the primary responsibility for assisting small business concerns is with the Commandant of the Marine Corps. The required authority and accountability is passed down through the chain of command to that level necessary to insure an effective program.

The Head of each procuring activity having authority to purchase in excess of $2500 is responsible for appointing a Small Business Specialist either on a full-time or part-time basis, depending on the amount of procurement performed, whose primary duty shall be to assist small business firms and to act as an advisor to all personnel involved with procurements. It is this group of Small Business Specialists which acts as the "watchdog" for small firms in their transactions with the Marine Corps.

Small Business Specialists help small firms to secure placement on the bidders list maintained in each procurement office. This involves contact with the firms, either through personal visits or correspondence, and a detailed explanation of what items are procured, how often they are procured and where they are procured. At the same time the prospective supplier is thoroughly briefed on specification requirements, the procurement procedures of the offices, and given other information which will be helpful to him in bidding on Government contracts. At the same time the small business firm can acquaint the Small Busniess Specialist, the contracting officer and procurement personnel, technical personnel, and procurement planning personnel with its products and capabilities. Bidders list application forms are furnished to the firm for completion and return

to the purchasing office and are used as a permanent source of information on prospective suppliers.

Each procurement request coming into the procurement office must pass through the Small Business Specialist. It is carefully reviewed to determine whether any of the requirements will preclude small firms from participating on an equal basis with large firms for the procurement. Specifications, quantities, and delivery requirements are discussed with technical and requiring activities to ascertain if there are any restrictive provisions and eliminate them if at all possible. Each procurement is screened to determine if it is in the small business potential, i.e., can it be produced or performed by a small firm? The procurement is also reviewed by a representative of the Administration to insure that he is satisfied that small firms are being adequately considered if possible. For each procurement in the small business potential which is estimated to amount to $10,000 or over, the Administration representative may initiate "set-aside" action to restrict a portion or all of the procurement exclusively for small firms. The Small Business Specialist then recommends to the contracting officer whether to agree to this proposed "set-aside" wholly or in part, or whether to reject the request. If a "set-aside" is made the Invitation for Bids or Request for Proposals will so state, and all bidders are thus put on notice of this restriction. Bids or proposals received from large firms are considered as non-responsive and rejected.

The next step is to determine whether the procurement will be advertised or negotiated. This decision is made by the contracting officer, however, the Small Business Specialist makes recommendations and suggestions which may make it easier for small firms to participate.

The bidders list is one of the most important areas where small firms can be assisted. The Small Business Specialist goes over the list after it is prepared to insure that small firms are fairly represented. He has authority to add the names of additional small firms if he desires. Another important step the Small Business Specialist takes is the analysis of previous procurements of the item. In the absence of procurement history much valuable information can be acquired from other procuring agencies of the Government.

Once an Invitation for Bids or Request for Proposals has been issued, the Small Business Specialist assists small firms interested in bidding by answering inquiries, directing the firms to other interested personnel for information, or doing anything that will help the small firm to furnish a responsive, competitive bid.

The Small Business Specialist follows each procurement through the entire procurement cycle to final delivery of the item purchased and payment to the contractor. He checks the bids after opening and consults with procurement and technical personnel regarding awards to insure that small firms are given every consideration. If there is doubt as to a small firms ability to perform a contract, he endeavors to get information regarding the firm from the Administration, other agencies and the firm itself, and makes appropriate recommendations to the contracting officer.

During contract performance small firms are given assistance by making advance or progress payments if required and justified. Help in finding raw materials, components, subcontractors, and prompt inspection service is furnished if desired. Delays in payments are investigated and expedited for small firms when possible.

While the procurement of supplies or services is the primary area where assistance is given small firms it is by no means the only area where they need and receive help or advice. Procurements which are not in the small business potential or which were awarded to large firms for any reason, often offer substantial subcontracting opportunities for small firms. The Marine Corps does not attempt to dictate sources of supply for its prime contractors, large or small, but it does urge and encourage large firms to make maximum utilization of small business concerns as subcontractors. The Small Business Specialist can give valuable assistance in this area by having ready reference to available small firms desiring subcontract opportunities. The Department of Defense has a Defense Subcontracting Program for this very purpose and it is estimated that small firms receive approximately as many defense dollars by subcontracts as they receive from prime contracts.

It may appear that small firms are given assistance only by the Small Business Specialist. Nothing could be further from the truth. In order to have an effective program of assistance, one which will create and maintain a climate in which small firms are given every possible opportunity to compete for Government contracts, it is absolutely essential that every person concerned with determining requirements, procurement planning, writing specifications, and the buyers, negotiators and the contracting officer, not only be aware of the assistance program, but understand and maintain a sympathetic attitude for the problems of small firms, and the essential part played by the small business firm in the important industrial potential as a part of the defense of our country and our national security.

MEANS AND ENDS: A THEORETICAL ANALYSIS OF RECENT FISCAL REVISIONS
(Section Two)

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(Section One of Dr. Finler's article appeared in the March issue of The Armed Forces Comptroller)

A COMMON DENOMINATOR OF BUSINESS AND GOVERNMENT ACCOUNTING: THE FUNDS STATEMENT

There is one form of accounting statement used in business financial reporting which is also applicable, consistently, to all government operations: the statement of source and application of funds. This is a treatment which dispenses with imputed costs ("non-cash" items), such as inventory adjustments, amortization of prepaid expense and depreciation.

Whether costs are computed on a current basis or by accrual, the results are not affected by this procedure. For example, since total business operating expenses are regularly augmented by accruals for imputed costs such as depreciation, the amount carried forward to the application of funds statement as operating expense is first reduced by exactly this same amount of depreciation "expense." Consequently, the incorporation of depreciation in this type of accounting – i.e., making all the effort of computing depreciation, putting it in and then taking it right out – becomes a pure redundancy, at any rate in a government agency: a case of accounting for the sake of accounting. It is also noted that

> Legislation authorizing the use of revolving funds in the Department of Defense does not permit the inclusion of depreciation as an expense in determining prices except those charged to non-Department of Defense customers. (E.L. Kohler and H. W. Wright, Accounting in the Federal Government, Englewood Cliffs, N. J., Prentice-Hall, Inc., 1956, p. 222.)

However, those who advocate the accrual of "non-cash" expenses recommend setting up charges for depreciation and a depreciation reserve, even though such charges are recorded only as "statistical" entries along with such other items as military pay, retirement fund contributions and workmen's compensation – all of which have nothing to do with recording the financial costs of operation, except possibly in terms of ultimate total cost to the government.

If the analysis here presented is valid, some significant implications follow with regard to both practical procedures and fiscal theory in both government and business. If "non-cash" items are excluded from consideration, the effect is to shift to a gross from a net basis for computing accounting data, for statements both of financial condition and of operating results; i.e., instead of showing assets as reduced by the cumulative reserve for depreciation, and operating results as net of the imputed capital consumption allowance and other "non-cash" items, the figures are shown gross.

Lest this information come as a shock to those who place a religious faith in the orthodox tenets of accounting textbooks, it should be noted that it is common practice for financial analysts of corporate operations and also for business management to ignore the charges and reserves for depreciation, and to use the gross data for fixed assets and for operating revenues (apart from the tax returns).

A discussion of accrual procedure would be incomplete if it did not point out that, apart from these "non-cash" items, the business firm does not have a complete statement of operating results until it has accrued its contingent costs for such accounts as income tax, bad debts, pensions and other items which will sooner or later result in completed transactions – and thereby affect its operating results – as distinguished from charges for imputed events which do not eventuate in actual transactions. For the typical government agency, however, these costs either do not exist or do not affect the operating results. The essential point is, therefore, not that the "cost-type" or "business-type" statement is wrong for purposes of government reporting, as that it is largely irrelevant.

In that case, what is the necessity for government agencies to go through all the motions of accruing "non-cash" items, if they are added in and then promptly taken out – apart from the tradition that presumably requires a "business-type" operation to show such charges, whether or not it pays any attention to them (except for the tax return)—? Justification can be advanced for only two possible purposes: first, for pricing – e.g., the need for including the cost of fixed assets as a component of price; and second (following logically from the first), for accrual from operating revenues of funds for replacement of fixed assets. However, unless the budget and legislative authorities permit government agencies to include depreciation in pricing and to accumulate replacement funds from revenues, any entries for charging depreciation or other "non-cash" charges are waste motion.

ADVANTAGES OF THE FUNDS STATEMENT

It is being suggested here that the funds statement has many advantages over the traditional statements of balance sheet and income and expense:– e.g., it is easier to derive; it is more readily understood; it dispenses with such ambiguities as "non-cash" expenses; it provides data which are more accurate and more significant; and it has been finding wide acceptance in financial analysis and management.

But besides all these merits, it is particularly to be recommended because this procedure is so close to the normal fiscal method of the federal government, i.e., appropriation funding and accounting. For as long as agencies are dependent on annual appropriations, there are bound to be statutory limitations on the commitment and/or obligation and/or expenditure of funds. Consequently, there will be numerous and continuing obstacles to attempts to set up precise rules for the implementation of revised requirements for accrual accounting, cost-based budgets and as-used basis for reporting. Government agencies are being faced with the problem of, first, adapting old systems to new requirements and, second, readjusting the system as new requirements are imposed.

If, instead of the traditional format of "status of funds," the financial report is conceived as a statement of "flow of funds," it is believed that many conceptual and practical difficulties can be readily resolved. The "flow of funds" statement would be similar to the statement of sources and applications of funds, and would posit that only actual transactions would be included, while entries for imputed costs such as depreciation and amortization of prepaid expense would be excluded. This procedure would similarly dispense with controversial requirements for valuation of fixed assets and inventories. It is in these latter areas, i.e., the capitalization of expenditures for property and inventory, that the difficulties chiefly arise.

The arguments for excluding valuation entries for fixed assets (depreciation) have been stated above. With regard to inventories of consumable supplies, a different kind of analysis is required. The significant information for fiscal purposes is not the level of an inventory, but the net change in inventory. The reason is to preclude overstating income, to the extent that an apparent decrease in material costs has actually reflected simply a net decline in the inventory carry-over (or, alternatively, the other way round). Consequently, a requirement that states merely that opening and closing inventories shall be recorded, and stops there, is a case of accounting for accounting sake.

In commercial practice, the valuation of the opening and closing inventories is necessary for the purpose of computing the operational results. That is, the value of goods on hand at the beginning of the fiscal period must be added to costs and the value of goods on hand at the end of the fiscal period must be subtracted, for determining the cost of goods sold.

Now, any economic unit, whether business or government, which produces goods or services for sale, must necessarily determine the cost of producing and disposing of those goods and services, in order to derive the financial results of operations. Consequently, the stocks of raw, semi-finished and finished materials constitute an intrinsic element in arriving at production costs, as indicated in the preceding paragraph. Moreover, in addition to stocks of production goods, every economic unit also will ordinarily procure and charge its operations for consumption goods, which do not enter directly into the production process, but are expended immediately on issue to the consuming departments of the organization. So long as there is no substantial variation in the amount of shelf stock carried over by operating departments from one year to the next, there can be no significant distortion of the operating results on this account.

The difference between the two alternative approaches referred to above, that is, adjusting costs for net change – as against gross level – of inventory, and moreover ignoring changes in prices thereof – as against commercial practices of repricing inventories – is the difference between a fruitful and sterile treatment of the subject. Specifically, the requirement that costs be related to the time period of use, rather than as paid, should be implemented simply by adjusting costs for this estimated net change in inventory (estimated since, at best, all accounting results are estimates). On the other hand, excessive zeal and haste in prosecuting the alleged objective of relating costs to use, in terms other than net change in cost of production, can conceivably result in an arbitrary requirement that all stocks should be reverted at the end of a fiscal period, and be repurchased with the new fiscal year funds by each agency. That is, a severely rigorous (although improbable) implementation of the as-used cost basis could require that all year-end inventories be reverted, newly priced and reissued as needed, in order to produce precisely accurate matching of revenues and costs.

Particularly for the typical government agency not in the business of producing goods and services for sale, no refinements should be required in terms of inventory adjustments, for the purpose of a proper accounting for appropriated funds.

IMPLEMENTATION OF NEW FISCAL REQUIREMENTS

The Navy Department has recently taken steps to implement the new fiscal directives of the Department of Defense, pursuant to Public Law 863, but toward what end-result it is

supposed to be moving is not yet clear. It is not yet clear whether it is intended to be in the direction of: (a) a shift to a business-type statement; (b) a refinement of the appropriation-type statement; or (c) some possible adaptation of the two.

As a matter of objective observation in terms of the preceding analysis, the implementation of Navy's revised system of fund accounting is found (by this writer) to constitute a tentative but concrete step toward the development of an adaptation of the statement of sources and applications of funds. However, whereas business accounting incorporates the statement of funds merely as a subordinate schedule, in governmental financial reporting this is the heart of the matter. That is, the traditional funding procedure seems here to have been translated into a "flow of funds," moving through a series of stages: from authorization, to commitment, obligation and finally expenditure.

For the purposes of this analysis and in the context of Navy's directives, it appears necessary and proper to define the term "fund" as an authorization account:— in the following context, that an authorization is not so much a cash or bank account as it is a capital or equity account. When conceived in these terms, the prescribed accounting procedure follows logically, first, of augmenting this account on the activity level not only in terms of authorizations or allotments of budgeted funds, but also of orders placed and accounts receivable; and second, of drawing against this account in the commitment-obligation-expenditure sequence.

Consequently, if the authorization account is treated as the debit or "sources" side of the fund "balance sheet," and the other accounts as the credit or "applications" side, total authorizations must equal the sum of commitments (not yet obligated or expended), obligations (not yet expended), expenditures, and uncommitted authorizations.

This may appear at first glance to constitute little more than a relatively minor refinement of the traditional status-of-obligation type of statement. There may be, on the other hand, a temptation to depreciate this presentation on the grounds that it is an entirely different species of animal from the business-type statement.

However, there appears to be a need, in both government and business management, to obtain and use financial reports which reflect the transactions of the relevant fiscal period in a simple, uniform, unequivocal, unambiguous and readily understandable form. As is obvious to anyone who has had to explain either the technical details or the conceptual significance of a conventional set of financial statements to a lay audience, a military establishment's budget council or a board of directors, in order to avoid a negative reaction it is necessary to stick pretty close to fundamentals.

The practitioners of accounting have their own phraseology, in much the same manner as the practitioners of economics, law, medicine and other learned professions. Now, ordinarily a physician's patients (except possibly for hypochondriacs and the parents of new-born children) are not interested in the details of pulse, blood pressure, hemoglobin count, etc. which — for the physician — constitute the significant data from which he derives his conclusions concerning the health and progress of the patient.

Similarly, for the ownership and management of an enterprise, the accounting details which go to make up a financial report are likely to arouse little interest outside the fiscal office. Of course, each individual departmental unit is concerned with the specific data relevant to its operations; however, the subject being considered here is the financial statement as a whole.

Now, in a private enterprise, every element entering into cost is of consequence in so far as it affects such vital information for managers and owners as return on investment, liability for income tax and implications for price policy. However, the typical government agency has no such interests. Consequently, when the administrators of government activities are told of new requirements for double-entry bookkeeping, cost-based budgeting and accrual-basis reporting, they naturally want to know what use (especially to them) these additional accounting computations are intended to serve. The following are some of the questions the recent accounting innovations may provoke:

Is it intended that — sooner or later — all agencies and activities will keep their accounts on an accrued-cost basis?

If so, will this replace the fund (commitment-obligation-expenditure) basis?

Will this eliminate the present medium of statutory limitation on the administration of funds in terms of obligations — without regard to expenditures?

Alternatively, will the statutory limitation be placed on expenditures, newly defined on an accrual basis — with an administrative but no statutory limitation on obligations?

Or will each activity have to keep a dual set of accounts and make a dual set of reports, i.e., on both appropriated fund and accrued cost basis?

CONCLUSIONS

If nothing else is accomplished by this paper, it is intended to stimulate analysts and administrators to take a closer look at some of the accounting dicta to which has been imputed the status of economic laws, while actually possessing only the attributes of working hypotheses. To assist that objective, the following observations are stated as a summary of the argument.

1. The purposes served by accounting theory and systems are as means to ends, rather than as ends in themselves.

2. The ends they serve are not universal, but may differ from one context to another, e.g., not merely as between government and business, but as between one business and another, and as between one type of government activity and another.

3. An essential fact to consider is that the federal government is not only business but the biggest business of all.

4. The rise of both the giant corporation and big government has generated dynamic changes in fiscal practices and new techniques in business administration and financial management.

5. A determination that government's fiscal methods should be rigidly patterned after certain practices of large corporate entities implies a degree of finality at variance with the changing character of the economy.

6. The subject with which the government accountant (like his counterpart in business) is primarily concerned is money.

7. Accounting theory and systems are concerned with the rules and procedures according to which the monetary results of an operation are established.

8. In the case of a private enterprise, the accounting must be made primarily in terms of the monetary return to management and owners, and only incidentally in terms of the aggregate flow of money through the enterprise.

9. In the case of a government activity, the statutory accountability is prescribed – into the foreseeable future – in terms of the appropriation and expenditure of funds. Therefore the primary subject for administrative accountability to Congress and the taxpayer is the flow of funds. Every other accounting matter is, as yet, of secondary interest.

10. On the other hand, the improvement of financial analysis and fiscal reporting in government would, on the basis of the arguments developed above, be handicapped rather than aided by the incorporation of textbook systems for the accrual of physical resources.

DON'T FAIL TO MAIL IN

ANY CHANGE OF ADDRESS

THE U. S. ARMY AUDIT AGENCY

Laurence W. Acker
Deputy Chief, U. S. Army Audit Agency

MISSION

As stated in AR 36-5, "The U. S. Army Audit Agency provides audit service for and within the Army Establishment, including overseas commands. This includes the audit of contracts between the Army and industrial, educational and commercial firms or institutions, and the internal audit of Army installations and activities, including civil functions."

This terse statement needs some elaboration if we are to understand the purpose, objectives and results of audit in the Army Establishment. In elaborating, it might be well to get away from the formal, stylized language of regulations, directives and procedural manuals and discuss auditing in more informal terms — as the auditor sees it.

The U. S. Army Audit Agency recognizes that, simply stated, the basic mission of the Army is success in combat. Successful accomplishment of this mission is the result of many positive factors. Aside from tactical considerations, with which the auditor is not concerned, one of the most important of these positive factors is the effective use of the Army's resources — men, money and materiel. The Army operates many installations at which soldiers are trained; materiel is received, stored and issued; research and manufacturing operations are carried on; and functions of an administrative nature, such as procurement, testing, inspecting, and the like are accomplished. In all these activities, dollars are spent for payrolls and for materiel. Accounts are kept, financial reports are made; budgets are planned, prepared and executed. With these things, the auditor is concerned, and herein lies his mission.

Still further elaboration would be helpful. The Army is concerned with managing its varied programs at the highest possible level of efficiency. It uses every managerial technique known to get the most out of each operational, research, and procurement dollar. In the operation of its construction programs, its depot system, the transportation function, and in the utilization of resources generally, efficiency and economy are the watchwords. Various controls and checks and balances are integral parts of the various programs, functions and activities of the Army. The U. S. Army Audit Agency is one of these internal controls which contributes toward the accomplishment of the Army's basic objective. It is a service organization which analyzes, evaluates, appraises and verifies matters having financial implications, for the benefit of contracting officers, installation commanders, technical service chiefs, and for staff agencies of the Army.

In summary then, the mission of the U. S. Army Audit Agency is to provide an auditing service to all levels of command and management — first, in the internal audits of installations and activities of the Army, wherever they may be located; and second, in the audits of contracts with industrial or commercial firms.

OBJECTIVES

Audit objectives are usually stated in broad, general terms, and provide definition and guidance both to the auditor and to the command which will be audited. Accordingly, even under the best of circumstances and with the use of the most precise language possible, the objectives are subject to interpretation by the auditor or by the commander. It is only by mutual willingness of the commander and the auditor to appreciate each other's viewpoints and responsibilities that the very substantial benefits of audit can be realized.

Audit objectives, as stated in AR 36-5, include:

> "***providing advice to procurement and financial management personnel on these matters (review and analysis of contractors' systems and controls for accuracy and propriety of contract costs representations)***
> "Protective and constructive service to management***"
> "***Determine the effectiveness of the financial management system employed***"
> "***assisting management at all levels in achieving efficient and economical administration***"

The broad objectives just quoted are sound and laudible. They may, of course, be subdivided into a number of sub-objectives that consist of audit tasks. They would be meaningless, however, if the auditor did not understand them, and if he were not conscious and appreciative of his environment and his responsibility to render a service to the several levels of command and management in the Army. They would be equally meaningless if the commander and higher echelons misunderstood the auditor's purpose and mistrusted his motives. Happily, in the Army, such commanders and auditors are a rarity.

A few words about the auditor's environment would be in order. First, he is independent of the command or activity being audited. The term "independent" sometimes has sinister implications to those whose activities are being audited. In the U. S. Army Audit Agency, independence does not connote untrammeled privi-

lege — it is not a permit to examine into areas beyond the auditor's legitimate interests or his competence. It is not a license to carp or criticize. Instead, independence is a responsibility. A responsibility to be governed by and to work in harmony with the policies of the Army and to analyze, evaluate, and report on conditions factually and objectively.

One important aspect of the auditor's work involves examining and reporting on transactions or situations, bringing to the attention of command the need for current improvement or corrective actions. As a result of his examination, the auditor may report on funds needlessly tied up as obligations where no obligation actually exists. He may report on the unauthorized use of Government property by a contractor; or the excessive financing of a contractor. He may report on the failure of a contractor to make good on its warranties; or on a situation where an item is being purchased from suppliers and sold as surplus at reduced prices at the same time and at the same location. He reports to command on such matters to provide the basis for current action by the command. It should be clearly understood that the auditor renders an advisory service to command in this respect and neither directs action nor takes action himself.

Of more importance, on a long-range basis, is the auditor's work in the field of measuring and evaluating the effectiveness of financial management controls. If these controls are effective, and if they are utilized properly, then only rarely would it be necessary to call to attention the need for corrective action on individual transactions or situations. Here the auditor examines into the implication of financial management policies and procedures and into the effectiveness of the policies and procedures themselves in the light of local conditions. Thus, as a preliminary step to participation in a physical inventory, he may review and appraise the inventory procedures to be used. He may examine into all aspects of payrolling, beginning with the authorizing documents in the personnel office to assure that internal controls are built into the procedures in such a way as to detect or prevent over or under payments. He may examine into all phases of the handling of engineering change orders to assure that internal controls are built-in to detect or prevent unnecessary tieing up of funds, appropriate payment to contractors if the change orders result in increases in the contract; or recoupment from the contractor if decreases are indicated. He may examine into all aspects of the receipt and storage of property to assure that there are necessary safeguards against receipt of substandard materiel, and that there are appropriate procedures, actually in use, to obtain refund from contractors or carriers where damages attributable to their actions are noted upon receipt of materiel. The auditor may examine into the procedures for preparation and analysis of financial and cost reports to assure that they serve as an accurate basis for command decisions. He reports to appropriate levels of command and management in the Army, based upon the examinations and evaluations considered as a basis for improvements in policies and procedures.

Audits can sometimes miss their goals of being constructive and beneficial to command and management. They may miss because an overzealous auditor may press his findings and recommendations with such fervor and in such a manner that the commander can agree with him only at the expense of loss of face and dignity for himself and his organization. On the other hand, the audit may miss just as surely where the commander lacks objectivity and is unwilling to consider any improvement if the idea does not come from within his own organization. Thus the auditor must deal with the human equations as well as the facts which become apparent through his examinations.

ORGANIZATION

The U. S. Army Audit Agency consists of a headquarters in Washington, D. C. and a number of field offices located at concentrations of industrial or military activity.

The head of the organization is the Chief, U. S. Army Audit Agency, who is also a member of the staff of the Comptroller of the Army. Headquarters is primarily a planning, policy making, and controlling element. It formulates overall agency operations and directs these operations. It develops and directs programs for the recruitment, training, and career development of the audit staff and non-technical personnel and provides budget, fiscal, and management engineering services for the Agency.

The field organization consists of nine regions, of which six of the regional headquarters are within the continental United States. Each region covers a specified geographical area and operates through several branches, each of which has a designated territory within which the audits assigned to it are performed. In some branches, in order to reduce travel, which is always heavy in an audit organization, area offices are established at points convenient to a number of installations or contractors subject to audit by the Agency. When the audit at an installation or contractor's plant requires the continuous presence of auditors, a residency may be created. Area offices and residencies are responsible to the Chief of the branch in whose territory they are located. There are currently in the 9 regions, 29 branches, 10 area offices, and 52 residencies.

Each branch is in the charge of a chief who is responsible for the performance of audit operations in his area. In the branch, supervising auditors have supervision of several concurrent audits to assure proper planning, programming

and performance, and a timely preparation and review of audit reports. Auditors-in-charge conduct individual audits, including the performance of surveys, preparation of audit programs, assignment of specific audit tasks to the staff, review of audit work performed, and drafting of the audit reports. Lead auditors are responsible to the auditor-in-charge for major segments of an audit program, and may have one or more auditors working under their guidance. Junior auditors analyze and verify accounting records and supporting documents; assist in reviewing accounting procedures and accounting controls and perform other detailed work in connection with the audits.

General supervision of the execution of the Agency's policies and programs in the field is the responsibility of its regional offices. In charge of each region is a Regional Director. On his staff is a Deputy Director, and usually two assistant Directors. Also on the staff, are supervisory auditors who maintain contact with the branches and with the audits which are in progress to assure performance in accordance with accepted auditing practices and with the policies established by the Agency.

PERSONNEL OF THE AGENCY

The principal asset of the U. S. Army Audit Agency is its personnel. On 31 March 1958, the personnel of the Agency totaled 2,360. Of this number, 384 were military, and 1,976 civilians. Analyzed another way 1,782 were auditors and 578 were administrative personnel.

A substantial number of the Agency's auditors have been with the Agency since 1946 when it was formed, and were auditing other activities of the Army before that time. Many of the auditors have had military service with the Army, either as officers or enlisted men. A large number, some 350, are Certified Public Accountants, many of whom have had previous experience with public accounting firms, or with industry, or with both.

Since 1953, the Agency has maintained an intensive college recruitment program. In the academic year 1956-57, for example, approximately 1200 college seniors with accounting majors were interviewed during visits to more than 125 colleges and universities. Approximately 700 college graduates have entered the U. S. Army Audit Agency since 1953. They were originally appointed at grade GS-5 ($3,670 per year). Promotions to grade GS-7 ($4,525 per year) are given to those who successfully complete a six-month period of intensive on-the-job and classroom training designed to mature the abilities required for audit assignments of increasing difficulty. A number of the early college graduate recruits have been successful with their careers with the U. S. Army Audit Agency and have been promoted to grades as high as GS-11.

Newly hired auditor personnel, regardless of salary level, are fitted into a comprehensive career development program, the objectives of which are to improve their knowledge, ability, and their understanding of the Army in its operations and their relationships thereto as auditors. Most of the training is on an actual assignment basis, under the direction of supervisory auditors who understand the Agency's objectives, and have demonstrated their ability to instruct and train subordinates. Training classes are conducted to round out the auditor and broaden his understanding of the manner in which the Agency performs its function.

AUDITS AND RESULTS

During fiscal year 1959, the Agency expects to make approximately 300 comprehensive audits of military installations and activities. In addition, it is estimated that the Agency will render audit service covering approximately 6,000 contracts with industrial or commercial firms or educational institutions. The benefit of much of the Agency's work is somewhat intangible and therefore not susceptible to evaluation in terms of dollar benefits. Many of the audit findings and recommendations deal with improvements in procedures and techniques which are not susceptible to pricing. As of 31 March 1958, however, the Agency's recommendations for 9 months had led to estimated dollar benefits of $123,000,000. These estimated economies result from recommended reductions in costs claimed by contractors, estimated recoveries from contractors and others, and the estimated value of recommendations for economies within the Army which were susceptible to measurement.

BUDGETING WITH AN ELECTRONIC COMPUTER

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INTRODUCTION

The budget analyst estimates the future money needs of a department, a factory, an office, or some other production unit by modifying past expense figures for a number of variables which apply to a future period.

The budget analyst can estimate money requirements with pencil, paper and desk calculator, in simple cases; or with an electronic digital computer, if budgets for many different production units are prepared and many variables are involved.

The objectives of budgeting are to provide an organized procedure for planning, a means for coordinating activities of various components of an organization, and a basis for control.

A lot of budget data both in business and government is recorded on punched cards and processed by electrical accounting machines (EAM) and by means of more powerful and versatile electronic data processing machines (EDPM).

SYSTEMS FOR BUDGET ESTIMATION AND REVIEW BY EDPM

Various systems are used for estimation and review of budgets and in some cases requirements are such the EDPM can be used effectively. Several systems for budget estimation and review by means of EDPM have been developed by federal government agencies and private business firms. Some of these systems are discussed in the following text which is presented for the benefit of any budget analyst who is investigating the feasibility of using EDPM in connection with budget estimation, execution, and review.

BUSHIPS PLAN TO BUDGET FOR ELECTRONICS EQUIPMENT BY EDPM

A feasibility study, conducted in the Bureau of Ships during the past nine months, has determined that EDP methods are suitable for programming the budget for electronics equipment such as radio, radar, sonar, and special devices.

Specifically, this feasibility study established the fact that the following outputs can be obtained by EDP methods: Apportionment request for the next Fiscal Year; budget estimates for each of two years beyond the next Fiscal Year; schedule for each ship and for each shore station for installing electronics equipment in each year of the five-year period beginning with the next Fiscal Year.

The foregoing outputs will be derived from the following inputs into EDP: Schedules for constructing new ships; schedules for converting ships from one type to another; schedules for improvement of ships in respect to material, operational, and/or habitability characteristics; schedules for overhaul of ships; population of electronics equipment in use at shore stations and on ships; and population of electronic equipment in inventory, including on hand and on order.

The outputs of EDP are related to each other as follows:

(1) The apportionment request for the next Fiscal Year, FY, should include funds for procurement of hardware to be installed in FY + 2. To reach this point in time it is necessary to consider the equipment installed in current Fiscal Year, material availability from stock and from on order, and material funded but not yet on order. In addition, equipment population must be considered as well as overhaul schedules and dates required for installation. Installations must be scheduled for FY, FY + 1, and FY + 2 for preparation of the apportionment request. Material allocation also must be accomplished to insure material availability before the installation of electronic equipment is scheduled.

(2) Likewise, the above procedure must be completed for preparation of the FY + 1 budget which covers material to be scheduled for installation in FY + 3 and for an estimated budget for FY + 2 which covers materials to be installed in FY + 4.

The input data heretofore described, in combination with some additional input data, could provide the basis for solution by means of EDP of other problems in the electronics area, namely: Preparation of material planning study; preparation of production record; preparation of mobilization planning production record; preparation of shipping instructions for material in stock or on order; stratification of inventories; automatic stock control and record keeping; automatic statistical and financial reporting and record keeping; and preparation of shopping lists.

It is hoped that the ultimate integrated EDP system for budgeting for electronics equipment will provide for automatic transmission of data between the Bureau of Ships and its field activities.

AIR FORCE'S MATHEMATICAL MODEL FOR BUDGETING BY EDPM

"The Trim System" of the U. S. Air Force is a generalized computational system for sol-

ving, by means of EDPM, a wide variety of management problems such as the planning and programming of operations, estimation of budgets, apportionment of funds, and computation of requirements. Computer routines for "The Trim System" have been coded for the Univac I computer and in the near future will be coded for the IBM 704 computer. Each problem processed by means of "The Trim System" must pass through five sequenced steps which are: Adaptation, data preparation, processing, computation, and publication.

"The Trim System" consists of a set of machine instructions together with the associated manual procedures for handling a broad class of problems by means of EDPM. These instructions and procedures are set forth in a 180 page book called The Trim Handbook. The basic philosophy and concepts of the operations of "The Trim System" are presented in a 39 page pamphlet entitled The Trim Guide.

OTHER BUDGETING BY EDPM IN THE FEDERAL GOVERNMENT

The U. S. Bureau of the Budget (BOB) has computed some budget figures on the U. S. Census Bureau's Univac computer. BOB does not require the full time use of a computer because BOB does not prepare budgets but only assembles and reviews the budgets prepared by other federal government agencies.

The Army Comptroller's Budget Plans Division has investigated the feasibility of budgeting by means of EDPM within office, Director of Army Budget. The results of this investigation are set forth in a study of 7 pages, dated 15 October 1957, which is entitled "Report of Feasibility Study on Mechanization of Data Processing Office, Director of Army Budget."

The feasibility of budgeting by means of EDPM at Army's Class I installations is scheduled for early investigation.

The U. S. Army Signal Corps has appointed a study group for exploring the feasibility of establishing a computer network for budgeting and funding.

The U. S. Air Force has a transceiver network which connects headquarters with every major Air Force installation except one. Information for budgeting and other purposes is transmitted over this network and fed into a computer for further processing. A study has been conducted at Wright Patterson Air Force Base for the purpose of determining the feasibility of budgeting by means of EDPM.

The federal government's entire public works program for a five-year period can be planned and budgeted on the Univac computer by means of a system that was programmed and coded at the U. S. Navy's David Taylor Model Basin.

THE GWU MATHEMATICAL MODEL FOR BUDGETING BY EDPM

The U. S. Army Logistics Research Project at the George Washington University has investigated certain areas of Army budget operation and the problem of creating a mathematical model for budget systems and their estimation which will provide a dependable basis for the estimation and review of budgets by means of EDPM.

The model that was developed uses a basic mathematical tool, i.e. matrices and their operations which are two way tables of numbers used for mathematical manipulation. Specifically, the model uses three matrices: an item unit requirements matrix, a cost per item unit matrix, and a dollar matrix.

The elements (component parts) of the dollar matrix are the products of the elements of the item unit requirements matrix (minus present inventory), and the elements of the cost per item unit matrix (employing usual matrix multiplication). The sum of the elements of the dollar matrix gives the total budget estimate. Also, any subtotal desired may be quickly obtained by so instructing the computer. The elements of the item unit requirements matrix are the expected number of each item unit required to accomplish the mission of the Army. By considering only those elements of this matrix which are concerned with a specific mission, the budget analyst obtains the expected total number of units of each item required to accomplish this specific mission.

A detailed explanation of this mathematical model is presented in a 36 page pamphlet entitled Special Report on Budget Research, which was published in August 1956 by the George Washington University.

MELPAR MATHEMATICAL MODEL FOR COMPUTING MATERIAL REQUIREMENTS BY EDPM

A system for computing material requirements by manual methods or by means of EDPM has been prepared by Melpar, Inc. for the U. S. Army's Deputy Chief of Staff for Logistics.

The Melpar computational system is a mathematical treatment of requirements computation which employs symbols, equations, and matrices. The matrix arrangement of data in rows and columns is used only for presentation of data. No matrix algebra is involved.

This computation system consists of five steps which are:

a. The given factors are arranged in matrix form. (rows and columns)

b. The requirements computation is stated in basic equation form.

c. Specific equations are written, using the given factors and supporting data.

d. Work sheets are developed for the com-

puted factors on which these specific equations are based.

e. Work sheets are distributed which contain parameters and instructions for calculation and reporting.

Because of the concise and rigorous mathematics of the system, optimum use can be made of EDPM. Principal advantages of these matrix presentations are: Simplicity and ease of use, clarity of presentation, flexibility to meet changes in guidance, and adaptability to new factors.

Requirements computations involve vast numbers of simple arithmetic operations. Some kind of automatic computation aid is needed, and the large scale digital machine is ideally suited to this kind of work. The Melpar computation system is capable of computing authorized allowance, replacement and consumption levels, and in transit and maintenance float. The System is outlined and discussed in a pamphlet dated 30 October 1956, containing 34 pages and entitled "Logistics Operations Research Summary Report on the Melpar Computational System (SR2-56)."

BUDGETING BY EDPM AT GE'S MAJOR APPLIANCE DIVISION

The Major Appliance Division, General Electric Company, Louisville, Kentucky, prepares its budgets on the Univac computer which generates monthly, quarterly and annual budgets and revisions thereto. The Univac has been programmed to:

a. Provide in advance the budgeted results of sales and production budgets.

b. Indicate the budgeted net income from sales for various sales and production model mixes.

c. Determine model selling prices required to achieve a predetermined net income from sales for a fixed production level.

d. Determine model mix and production level to achieve a predetermined net income from sales at predetermined prices.

e. Determine in advance the net income from sales resulting from proposed changes in sales or production levels.

f. Provide detailed operating budgets down to the operation supervisor's level.

This computer has been programmed to calculate the budgeted net income from sales for any prescribed combination of sales volume, production volume, selling price, and price allowances. Since a single department might have over 37 thousand combinations of these factors, it is obvious that without EDPM it would not be possible to compute the budgeted net income for every combination. The budgets prepared by computer will be more timely and realistic than they have been in the past because the computer can prepare budgets needed for pre-analysis of the impact on profit from alternate combinations of recent facts, management judgment, and actions of competitors.

This project is described in W. W. Smith's article, "Impact of Computer on Methods," published in Office Management Series Number 136, American Management Association.

LABOR BUDGETING BY EDPM AT GEORGIA DIVISION, LOCKHEED AIRCRAFT CORPORATION

The labor budget of the Georgia Division, Lockheed Aircraft Corporation is prepared by means of EDPM. This budget indicates the number of personnel required by each department for each week of the following quarter and the number of manhours which should be expended on each airplane. The labor budget is prepared before the beginning of each quarter and is recomputed quarterly as a result of engineering changes, re-evaluation of work, and past experience.

Two types of labor forecasts are involved in the preparation of the labor budget. These are:

a. The number of manhours required for a particular plane in a particular cost center which is a functional subdivision of a department to facilitate routing of work, segregation of costs, and measurement of group performance;

b. The number of manhours required in each cost center during each week of the quarter.

No new theory or methods are used in calculating the quarterly forecasts by means of EDPM. The method used on EDPM is essentially the same as that used previously by the labor analysts. The following advantages have resulted from the preparation of the labor budget by means of EDPM:

a. The labor budget prepared by labor analysts was six weeks old at the time it was released, but is only three weeks old at the time of release if preparation is accomplished by means of EDPM.

b. The cost of preparing the labor budget by means of EDPM is only half the cost of the budget prepared manually by labor analysts.

c. The labor budget prepared by means of EDPM is more accurate than the labor budget that was prepared manually by labor analysts.

Preparation of the labor budget by means of EDPM, as outlined herein is discussed by C. W. Schmidt and R. W. Bosak in an article entitled "Production Scheduling and Labor Budgeting by Computers" which appears in a book published by the American Management Association (AMA) under the title "Electronic Data Processing in Industry, A Case Book of Management Experience," AMA Special Report No. 3.

BUDGETING BY EDPM AT SEARS ROEBUCK AND COMPANY

Sears Roebuck and Co. has installed a medium-sized electronic computing system

which in its first six months of operation was used primarily in preparation of semi-annual sales and inventory budgets for each of Sears' 725 retail stores. Before Sears acquired the computer, these sales and inventory budgets were prepared by personnel of each store.

Since this budgeting operation involves 725 retail stores, each averaging about 40 divisions, more than 25 thousand store division budgets must be prepared, each containing monthly figures showing the sales inventory, on order, open to buy, receipts in-sight, and turn over ratios.

The Sears budgeting program has the broad purpose of finding the optimum dollar inventory which each division in the 725 retail operations should carry to support its sales expectations adequately and economically. Total machine time for the budgeting job is about 300 hours or 0.7 of a minute for each division in each store. As much as 10 manhours was required per division when budgeting was done in the field.

Sears has found that budgeting by means of a centrally located computer has four advantages. First, it relieves the store manager of a chore which formerly required valuable time that is available now for performance of other management responsibilities. Secondly, it has improved store budgets so much that they have become an effective and economical tool for dollar inventory control. Thirdly, it allows rapid adjustment for meeting sudden contingencies such as a change in demand due to fluctuations in general economic conditions. Fourthly, and most significantly, it improves merchandise turnover performance in Sears stores and points to corrective measures in those stores which have low turnover.

Since the Sears budgeting application takes less than a third of a computer shift, the computer is used for other data processing jobs such as sales analysis, payroll, and analysis of customers' response to catalogs.

The manner in which Sears is using its electronic computing system is discussed in the April 1957 issue of Chain Store Age in an article entitled "Going into a Computer Program."

CONCLUSION

The use of a digital electronic computer should be considered both in preparation and administration of a budget because the computer can prepare a budget efficiently and perform other functions such as showing the effects of apportioning a reduced budget; because it allows rapid adjustment for meeting sudden contingencies; because it provides better budgets resulting in better budgetary control over operating programs which must share in use of common resources; and because it provides a budget in less time and at lower cost per budget item.

Plan now to attend the 2nd National Convention to be held in Washington, D.C., on Thursday and Friday, 23rd and 24th of October 1958.

NUMBERING NUMBERS

Cdr. X. Bender Tansill, USNR (Ret.)
U. S. Army Audit Agency

This business of numbers has been closely associated with the work of the accountant and the auditor since time immemorial, but the age of automation has given the old task a new twist. As accountants, we have been accustomed to the numbers used in the decimal system. With the advent of automatic or electronic data processing systems, we come face to face with a different application of numbering — the use of the binary numbering system.

Fortunately, the accountant will not directly face this problem of conversion of one numbering system to another because the automatic data processing systems' equipment or "hardware" does this automatically for him. However, since by nature the accountant and the auditor are inquisitive and curious people an explanation of the numbers' systems is deemed appropriate.

Numbering systems are simply and plainly conventions or arrangements, orderly and uniform in essence, which use marks of one description or another, to make quantative measurements or records. The decimal system is the most familiar method to most everyone. It uses the ten marks (or Arabic numerals) 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9.

While the decimal system is rather universally adopted (even the Russians and Japanese use it as well as most of the other peoples of the world) there have been other numbering systems used in the past. Probably the most familiar to most of us is the Roman numeral system which used the seven marks (letters) I, V, X, L, C, D and M. Furthermore, the Mayans, in the days before the discovery of America, used a five-mark system (which we term a quinary numbering system).

A listing of some of the more important numbering systems is:

System	Marks in Common Usage	Radix
Decimal	0, 1, 2, 3, 4, 5, 6, 7, 8, 9.	10
Binary	0, 1.	2
Trinary	0, 1, 2.	3
Quinary	0, 1, 2, 3, 4.	5
Octal or Octonary	0, 1, 2, 3, 4, 5, 6, 7.	8
Duodecimal	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, x, y.	12

You will recognize these terms from their Latin stem derivations as tens, twos, threes, fives, eights and twelves. The duodecimal system has partially crept into English usage and may be associated with linear measure, twelve inches to the foot; troy weight, twelve ounces to the pound; money values, twelve pence to the shilling, etc.

For purposes of computing and data processing, the decimal system is one of the most difficult to use; in fact, it is actually a rather poor numbering system. You cannot get as many whole number fractions in it, for instance, as you can in the duodecimal system. In the former you can get only three such subdivision, i.e., 1/2 of 10 equals 5, 1/5 of 10 equals 2, and 1/10 of 10 equals 1; whereas in the latter you can get five — 1/2 of 12 equals 6, 1/3 of 12 equals 4, 1/4 of 12 equals 3, 1/6 of 12 equals 2 and 1/12 of 12 equals 1. Since the decimal system is difficult to work with, most computers operate in a simple numbering system; the one known as the binary code.

THE ORIGIN OF A NUMBERING SYSTEM

What makes a numbering system. The selection of the "marks" used to indicate numbers follows no set plan. The purpose for four (4) following three (3) in our decimal system was born of chance. We adopted the Arabic system of numbering and thereby accepted it without any further reasoning. However, when we advance in our Arabic numbers from nine (9) to ten (10), we do encounter a basic reasoning process which is founded on the two following steps:

Step 1. Advance the "mark" or number on the extreme right, the "9" referred to above, back to the first number in the system, a zero or cipher (0) in this case.

Step 2. Next, shift one column to the left and advance whatever mark was in this column to the next higher mark in the system. In this instance, an implied "O" is advanced to the next higher mark in the system, which is the "1" in this situation.

We now have a method for progressing from one number to the next higher number in a numbering system. To repeat:

Rule 1. Advance the number on the extreme right to the next number in the system, as from "3" to "4", noted above.

Rule 2. If the number on the extreme right is the last "mark" or number allowed in the system, change it in that column to the first number in the system. Then move one column to the left and advance the "mark" or number found here to the next higher "mark" in the system.

Rule 3. If this column to the left also contains the last "mark" or number in the system (i.e., 199, 299, 899, etc.), follow Rule 2 above until you reach a column to the left where you can change the number in that column to the next higher "mark" or number in that system.

This is the plan and procedure as well as the base or standard for a numbers system, regardless of the numbering "marks" or numerals used or of how many "marks" there are in the system.

Now let us apply this knowledge. To advance from, say 234, to the next higher number, 235, we use Rule 1 and determine that the number to the extreme right in this group of figures is a "4", which is then raised to a "5", thus producing the number 235.

Next, consider the figure 239. Here we apply Rule 2 inasmuch as the number at the extreme right is a "9" and this is the upper most limit of numbers or "marks" used in the decimal system. Therefore, applying Rule 2, we change the "9" to the first number or "mark" in the system, a zero (0). We then move one column to the left and change the "3" in the original figure of 239 to a "4", thus arriving at the figure 240.

Finally, the third rule may be called upon when we use numbers ending in two or more "9's", such as in the case of 299, 3999, 79999, etc. In the case of 299, for instance, we arrive at the next higher number, by the use of Rule 3. The "9" at the extreme right is changed to a zero (0); then a shift is made one column to the left. We find that this column also has a "9" so we change this number to a zero (0) and again shift to the next column to the left. This third column contains a "2" which we now change to a "3" and arrive at the number 300. This same procedure can be followed for 3999, 79999, etc. By observing these three rules, we have a plan or method for finding, in a given numbering system, the logical succession or sequence of numbers or "marks."

These rules, we will presently perceive, apply with equal force to other numbering systems such as in the straight binary code; the one used in most digital computers and digital control systems.

THE BINARY NUMBERING SYSTEM

There are only two "marks" used in the binary numbering system. Generally, the Arabic numerals O and 1 are used to represent these numbers, although letters or special symbols would serve the same purpose. The following table compares decimal numbers 0 through 15 with binary-number equivalents:

Decimal	Pure Binary
0	0
1	1
2	10
3	11
4	100
5	101
6	110
7	111
8	1000
9	1001
10	1010
11	1011
12	1100
13	1101
14	1110
15	1111

From the above, we note that in binary, 10 follows binary 1, binary 100 follows binary 11, binary 1000 follows binary 111 and so forth. We also realize that 1 equals 1 in both systems. Applying the criteria set forth above, we see that in binary we advance from 10 to 11 as well as from 110 to 111 and from 1110 to 1111, by use of Rule 1. We also recognize that in binary we advance from 1 to 10, from 11 to 100, from 111 to 1000, etc., by using Rule 2.

It is to be remembered that in binary all numbers have but two given "marks." Numbers appear as 1101, 110011, 1111111, etc., but only zeros and ones are listed. If any other "mark" or number, such as a 2 or 3 or 7, is present with the O and 1, it is not the binary system. Of course, we could use the letters x and y or the Greek letters for alpha and beta, but engineers and mathematicians generally prefer to use the Arabic numerals 0 and 1.

CONVERSION OF BINARY TO DECIMAL AND VICE VERSA

If we were adept in the use of binary numbers, we would know binary numerals for what they are, but this is not the case with most of us. We have been taught to think in and use decimal numbers; therefore, we must learn how to convert these systems back and forth. In order to facilitate these maneuvers or interchangeability of the two systems, decimal and binary, let us examine what conventional decimal numbers actually represent.

In the decimal system, we think in "tens." The number 58 means:

10 plus 10 plus 10 plus 10 plus 10 plus 8.

This may be written as:

$5(10)$ plus $8(1)$ equals 58 or as
$5(10^1)$ plus $8(10^0)$ equals 58.

The number 4321 similarly means:

4000 plus 300 plus 20 plus 1, or
$4(10^3)$ plus $3(10^2)$ plus $2(10^1)$ plus $1(10^0)$
or $4(1000)$ plus $3(100)$ plus $2(10)$ plus $1(0)$.

It is to be recognized that the number 10 appears to the various powers. Accordingly, it is deduced then that all numbers are obtained by using the

total number of "marks" in the system (called the radix) raised to the various powers.

To illustrate this let us convert a binary number to a decimal number; say binary number 10110111. As there are only two "marks" used in binary, the radix is the number 2.

$10110111 = 1(2^7) + 0(2^6) + 1(2^5) + 1(2^4) + 0(2^3) + 1(2^2) + 1(2^1) + 1(2^0)$, or
$1(128) + 0(64) + 1(32) + 1(16) + 0(8) + 1(4) + 1(2) + 1(1)$ or
$128 + 0 + 32 + 16 + 0 + 4 + 2 + 1$
equals 183.

A table of powers of common number systems follows:

Binary		Octal		Decimal	
2^0 equals	1	8^0 equals	1	10^0 equals	1
2^1 "	2	8^1 "	8	10^1 "	10
2^2 "	4	8^2 "	64	10^2 "	100
2^3 "	8	8^3 "	512	10^3 "	1,000
2^4 "	16	8^4 "	4,096	10^4 "	10,000
2^5 "	32	8^5 "	32,768	10^5 "	100,000
2^6 "	64	8^6 "	262,144	10^6 "	1,000,000
2^7 "	128	8^7 "	2,097,152	10^7 "	10,000,000
2^8 "	256	8^8 "	16,777,216	10^8 "	100,000,000

The binary numbering system is most suited for the application of arithmetic. For this reason, it is used in electronic computers. Addition, multiplication, subtraction and division are all simply calculated in binary. This fact is set forth in detail in the following paragraphs.

ADDITION

To form an addition in the decimal system, we must commit to memory the addition tables; that is, we remember that 8 plus 5 are 13; that 7 plus 9 are 16, etc. In binary only two simple rules need remembering, thus:

Rule 1. 0 plus 1 is 1; and
Rule 2. 1 plus 1 is 0 and carry a 1 to the next column to the left.

We can work any problem in addition in binary by applying these two rules. Accordingly, should we wish to add in binary 10 (2 in decimal) to 11 (3 in decimal) we would get this result:

Binary		Decimal
10		2
11		3
1		
0	- Carry 1 left (index)	
1	- the number carried	
101	Result	5

101 (binary) equals $1(2^2) + 0(2^1) + 1(2^0)$ in decimal or $4 + 0 + 1$ equals 5.

Let us now add two more numbers, for instance, decimal 11 (binary 1011) to decimal 15 (binary 1111), thus:

Binary		Decimal
1111		15
1011		11
0	carry 1	
1	carry 1	
0	carry 1	
1	carry 1	
1	the carry	
11010		26

We can now convert 11010 in binary to decimal in the following manner and prove our calulation.

$1(2^4) + 1(2^3) + 0(2^2) + 1(2^1) + 0(2^0)$ equals $16 + 8 + 0 + 2 + 0$ or 26.

MULTIPLICATION

As in the case of addition, multiplication in binary is extremely simple. There is no need to commit to memory involved multiplication tables. It is in essence a process of addition and moving progressively to the left or indexing as it is referred to technically. To illustrate let us multiply binary numbers 111 by 101 (7 x 5 in decimal or 35). We do this by employing these two rules:

Rule 1. 1 x 0 is 0; and
Rule 2. 1 x 1 is 1.

Using these two rules and preserving the conventional method of indexing or shifting to the left, we arrive at this calculation and answer:

Binary	Decimal
111	7
101	5
111	
000	
111	
100011	35

Converting binary number 100011 to its decimal equivalent we get:

$1(2^5) + 0(2^4) + 0(2^3) + 0(2^2) + 1(2^1) + 1(2^0)$
equals $32 + 0 + 0 + 0 + 2 + 1$ equals 35

SUBTRACTION

Subtraction in binary code is more involved than addition in binary. It requires the use of a technique known as complementing. Complementing means adding that which completes a number. As the complement of a given number, say 23, is obtained by subtracting it from some reference number such as 100, we find by deduc-

tion that the complement is 77. Now if we had desired to subtract 23 from say 37, we can accomplish this "subtraction by addition" by adding 37 to the complement of 23 or 77 (37 + 77) and arrive at 114. Next we cancel the reference number (100) by discarding the first 1 in the figure 114 such as ⁄114, and we arrive at the answer 14 by addition. Hence, we find that subtraction can be accomplished or worked by the addition of the complement of a given number, if the reference number is cancelled or discarded. Remember that the reference number appears in the n + 1 column where a number with n digits is being complemented.

HOW TO COMPLEMENT A BINARY NUMBER

A binary number is complemented as follows: Change each 0 to 1 and each 1 to 0 and then add a 1 in the furthest column to the right. For instance, the complement of 111 in binary is obtained by changing this number to 000 and then adding a 1 to the right hand column to get 001. Another example is this — the complement of 101010 is 010110, arrived at thus:

101010 Change the 1's to 0's and the 0's to 1's as follows:
010101 add 1
1
010110 and the result is the complement of 101010.

The binary complement is employed to subtract by addition in the following manner:

	Binary	Decimal
	10101	21
Subtract	01010	10
		11

The number to be subtracted - 01010, is complemented to obtain 10110 as the complement and this figure is then added to 10101 as follows:

	10101
Add	10110
	1 01011

The overflow figure, the 1 in the leftmost column, is discarded or cancelled as ⁄01011, leaving 1011 which is the figure eleven (11) in decimal.

DIVISION

Computations in division, in binary, are worked in much the same manner as in decimal division but are notably more simple. The test is to see whether the divisor will go into the dividend or not. If the former condition prevails, a 1 is carried into the quotient, if not a 0 is placed there. The point to remember is that division is the reverse of multiplication. To illustrate, let us multiply 6 by 7 in decimal to get 42. In binary the same calculation would be 110 by 111 equals 101010, and is arrived at in this manner:

Multiply	110
By	111
	110
	110
	110
(Note that these are implied 2's.)	12210
Carry 1, cancel 2	12
Carry 1, cancel 2	12
Carry 1, cancel 2	12
	101010

In the above, we actually cancel two 1's and carry to the next column to the left the carry of 1.

Now let us proceed with division. If we wish to divide say 42 in decimal by 7, we arrive at the figure 6. In binary, it would be 101010 divided by 111 equals 110. To illustrate this division in binary, we proceed as follows:

Note that the divisor 111 is greater than the first three digits of the dividend - 101. Therefore, we place a zero in the quotient and carry 111 into the first four digits of the dividend which are 1010, in this manner:

	0110
	111) 101010
	xx
Cancel 1, carry back 2	⁄1 1
Cancel 1, carry back 2	⁄1 1
Cancel 1, carry back 2	⁄1 1
Place a 1 in the quotient and deduct the divisor from this much of dividend	111
Deduct and carry down next figure in dividend	--111
Place a 1 in the quotient and deduct divisor from this balance	111
Deduct and carry down next figure in dividend	---0
Divisor will not go into remainder so place a zero in quotient.	

Next let us reverse the process. This time we will divide 101010 by 110 to get 111. It is to be noted that 110 will not go into 101 so we place a zero in the quotient and carry 110 into 1010 as follows:

```
                  0111
          110)101010
              1 1  xx
Cancel 1, carry back 2
                1
Place a 1 in the quotient and deduct
  the divisor from this much of      110
  dividend and carry down figure    -1001
Cancel 1, carry back 2
              1 1
                1
Cancel 1, carry back 2
              1 1
                1
Place a 1 in the quotient and deduct
  the divisor from this balance      110
Carry down next figure in dividend  --110
Place a 1 in the quotient and deduct
  the divisor from this balance      110
Deduct to complete                   ---
```

Finally, suppose we wished to divide 13 by 4 to get 3.25. Here we leave pure whole numbers and use a decimal point which is a misnomer in the language of binary numbers. It actually should be referred to as the binary point. In binary, 1101 is the equivalent of 13 in decimal and 100 in binary represents 4 in decimal. The calculation in binary is made in this manner. Note that 100 goes into 110, the first three digits of the dividend; therefore, our first number in the quotient is 1.

```
                  11.01
          100)1101.00
              x  xx
Place a 1 in the quotient and deduct
  the divisor from this much of
  dividend                           100
Carry down next figure from
  dividend                          -101
Place a 1 in the quotient and deduct
  the divisor from this balance      100
Carry down next two figures from
  dividend                        --1 00
  placing a (decimal) point in the
  quotient as well as a 0
Place a 1 in the quotient and deduct  1 00
  the divisor from this balance     -----
Deduct to complete.                 - --
```

To prove our work, we convert the quotient into its decimal equivalent in the usual manner:

11.01 equals $1(2^1) + 1(2^0) + 0(2^{-1}) + 1(2^{-2})$ or 2 + 1 + 0 + 1/4 equals 3.25.

It is to be remembered that our progression in binary in whole numbers is 0, 1, 2, 4, 8, 16, 32, 64, 128, 256, etc. Accordingly, when we interpose a "binary point" (decimal point in disguise), we progress in binary fractions as follows: 1/2, 1/4, 1/8, 1/16, 1/32, 1/64, 1/128, 1/256, etc.

In conclusion, to complete our consideration of the different numbering systems, let us review a problem in multiplication carried out in the manner the Romans would have proceeded. Here we will multiply 123 (CXXIII) by 165 (CLXV) to arrive at 20,295 (????):

```
                                                C   X   X   I   I   I
                                                        C   L   X   V
                                            D       LL              VVV
                                        M       CC              XXX
                                    MMMMM   DD          LLL
                    MMMMM MMMMM     MM      CCC
MMM MMMMM MMMMM MMMMM MMMMM DDD CCCCC LLLLL XXX VVV

Cancel VV
  and convert to X                                          X
Cancel LLLL and
  convert to CC                                 CC
Cancel CCCCC and
  convert to D                          D
Cancel DDDD and
  convert to MM

        MM
        MMMMM MMMMM MMMMM MMMMM   CC    L XXXX V
or              20,000              200  50  40  5
equals 20,295.
```

KNOW YOUR OFFICERS

Brigadier General Frederick L. Wieseman,
U. S. Marine Corps

Vice President of ASMC

Brigadier General Frederick Leonard Wieseman, whose thirty-one years of continuous service includes duty as an enlisted Marine, midshipman and Marine officer, is serving at Headquarters Marine Corps, Washington, D. C., as Marine Corps Fiscal Director.

He was born in Milwaukee, Wis., and graduated from high school at Palmyra, Wis., in 1925. He served in the Marine Corps two years before being appointed to the Naval Academy. Upon graduation in 1931, he was commissioned in the Marine Corps.

His service includes duty in the Fleet Marine Force, sea duty on two occasions, two tours at Headquarters Marine Corps, three assignments with the Marine Corps Rifle and Pistol Team, Parris Island and Quantico several times. He is a graduate of the Basic School, Junior Course Amphibious Warfare School, and the Armed Forces Staff College. In addition, he has attended a number of short instructional courses. He was on the instructional staff of the Marine Corps Schools for three years from 1949 to 1952. While serving in the Educational Center from 1949 to 1952 he was chairman of the committee and technical supervisor of the development and construction of the Amphibious Warfare Trainer, now known as Ellis Hall.

As a junior officer, he was active in shooting and athletics both as a competitor and coach. He played football with the Parris Island Marines in 1932, coached the Parris Island basketball team two seasons from 1932 to 1934 and the Quantico football team in 1935 and 1936.

He participated in the Guadalcanal, Bougainville, and Marianas campaigns during World War II. While often identified with the logistical field, his primary interests are in the broad field of amphibious operations and its evolution from a two to a three dimensional concept. This facet has resulted in a great many collateral assignments on boards and panels including the Structure Board in 1948, Marine Corps Equipment Policy Panel in 1950, the AdHoc Committee for the revision of Landing Force Doctrine in 1951-52 and the Advanced Research Group in 1954.

In addition to making the Pacific Islands circuit during World War II, he served in China from 1946 to 1948 and in Japan 1953-54. As the representative of the Commander Naval Forces Western Pacific General Wieseman negotiated with the Chinese Communists for the release of a Marine plane crew, shot down and held by them in Shantung Province in 1948.

General Wieseman was awarded the Legion of Merit for service in the 3d Amphibious during the Guam Operation. For similar service with the 1st Marine Amphibious Corps in the Bougainville campaign he was awarded the Bronze Star Medal.

In addition to the Legion of Merit and Bronze Star Medal with Combat "V", the general's decorations and medals include the Presidential Unit Citation Ribbon, American Defense Service Medal, American Campaign Medal, Asiatic-Pacific Campaign Medal with four bronze stars, World War II Victory Medal, China Service Medal (1945), National Defense Service Medal, Korean Service Medal, United Nations Medal and the Order of Cloud and Banner (China).

General Wieseman and his wife, the former Dorothy Estella Bateman of Hughesville, Pa., have one son, John T. (born May 28, 1936). His mother is Mrs. Minnie Wieseman of 228 North Prairie Street, Whitewater, Wis. His father is deceased.

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